Steel Stocks Dwindle Rapidly

Consumers Run on Warehouses

Aluminum Strike Is Threatened

# The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

AS the steel strike entered its second week the real need for a speedy settlement was the dominant note in all circles. Steel stocks, which obviously were smaller than had at first been thought, were shrinking fast. Losses in money and materials were mounting at a staggering rate. And labor, management and government were all trying to squirm from under the accusing public eye and absolve themselves from blame for the strike which should never have occurred.

In its first week the strike cost the steelworkers more than $30 million in lost wages. It cost steel firms more than 1.4 million tons of steel in lost production. But the loss did not end here. Like a pebble dropped in a quiet pool, its impulse was spreading in all directions. Its crippling effect was threatening to engulf the entire economy.

**Steel and Labor Planning Next Move**

This week both steel and labor are planning their next step in the battle of pensions. The government will probably succeed in bringing them together this week or next. The seriousness of the strike makes that imperative. If real collective bargaining does not take place, the country can look for one of the worst tieups in its history because it will knock recovery efforts of the economy into a cocked hat.

A careful check by IRON AGE editors reveals the following: (1) Steel stocks in the hands of manufacturers are generally smaller than had at first been estimated. (2) Steel consumers are making a run on the warehouse bank. (3) Some plants have already been forced to curtail manufacturing operations. (4) Demand for aluminum, a steel substitute in some applications, has spurted sharply. (5) Steel buyers are once again camping on the door steps of the few mills which are still operating.

This week close checking indicates that few big fabricators will be able to operate more than 30 days without curtailing production. Several very large firms told THE IRON AGE they expect to shut down some manufacturing divisions within 2 weeks. Most curtailments so far noted have been by smaller firms who were caught flat footed by the strike.

**Warehouse Billing Falls Behind**

The run of steel consumers on warehouse stocks almost became a stampede during the first few days of the strike. It is now beginning to taper off. Warehouses are trying to allocate their limited stocks among old and new customers. They have established informal but effective quotas. Some have called their salesmen in from the field to answer telephone calls.

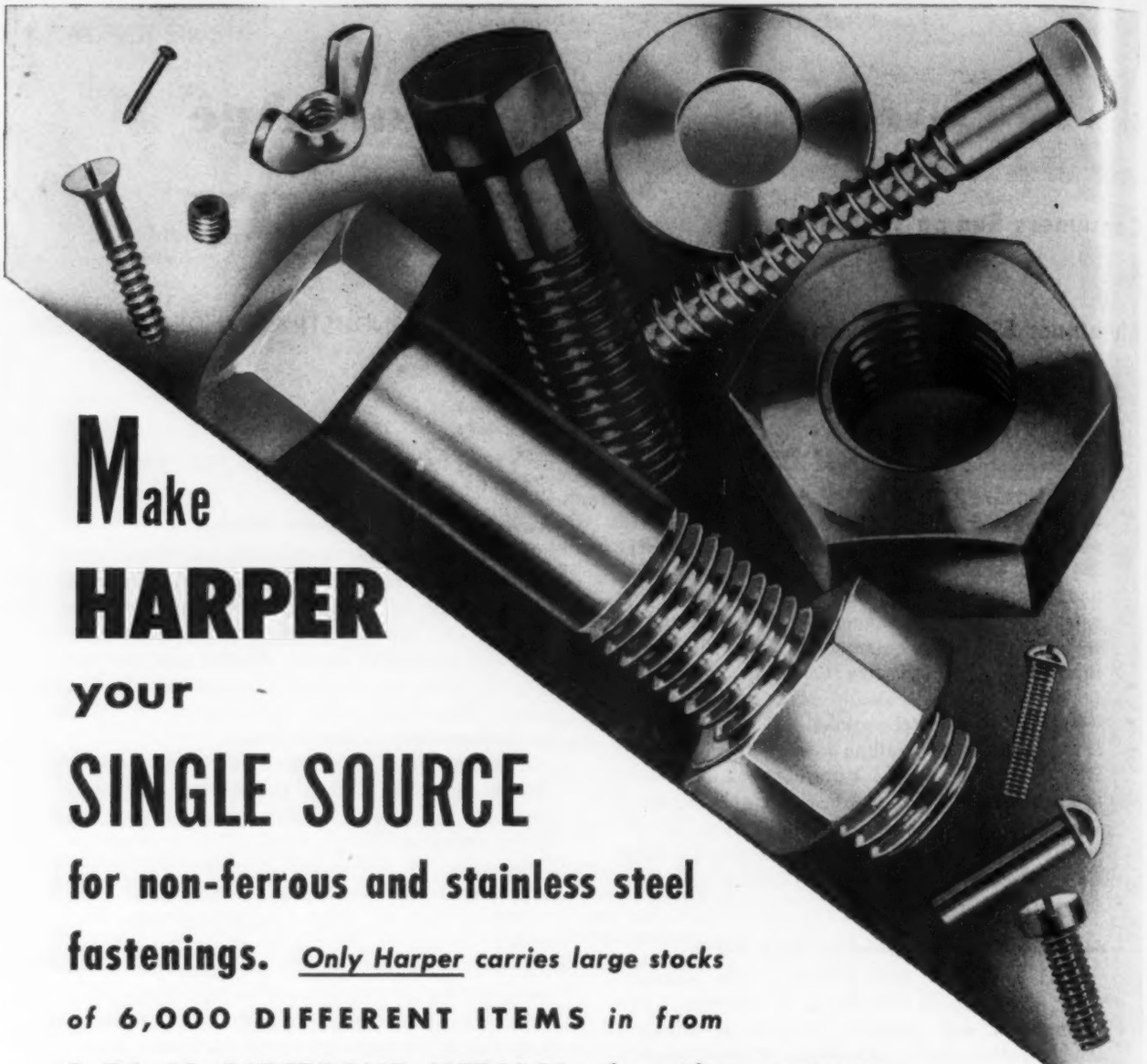
It is impossible to tell how much steel has been shipped since the strike. The warehouses themselves do not know. In the past few days of hectic shipping billings have fallen as much as 2 weeks behind. Galvanized sheets and cold-rolled sheets are the items in tightest supply.

Central Iron & Steel Co., Harrisburg, Pa., agreed to the unions terms of 4¢ per hr for insurance and 6¢ per hr for pensions on a non-contributory basis, with details of the plan to be worked out later. Following this the company raised the price of plates $5 a ton. Those who remembered that the settlement of the steel strike in 1946 was accompanied by a similar boost were watching this development closely.

**Aluminum Strike Threatened, Too**

Although orders for aluminum jumped sharply, this alternative avenue of supply for some fabricators may be short lived. The Steelworkers' union has served formal strike notice on the Aluminum Co. of America which produces about half of the nation's aluminum. Unless last minute negotiations are successful the strike will begin at 12.01 a.m. Oct. 17.

In spite of the steel strike there was a fair amount of activity in most scrap markets this week. Prices were generally very firm in major centers. The exception was at Philadelphia where No. 1 heavy melting steel slipped $1.00 a ton. This lowered THE IRON AGE steel scrap composite to a $26.58 a gross ton, a drop of 34¢ from last week. Steelmaking operations this week are scheduled at 9 pct of rated capacity, up 1 point from the previous week.



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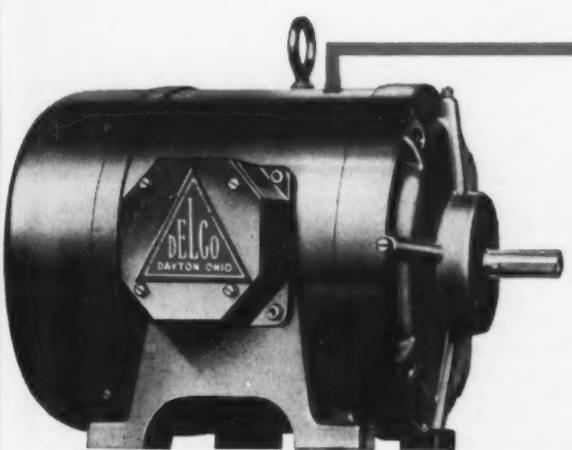
# Why Ostriches make poor production men

The trouble with sticking your neck out in the matter of slashing production costs is that you're likely to get a biased view of things.

Cutting corners indiscriminately, buying entirely on a price basis, continuing to put up with over-age and under-built motors . . . such a policy may lead to pennies saved but will surely lead to dollars lost.

*Real* production economies, on the other hand, are effected by production men who see to it that their plants have machines that keep production rolling... machines that waste no time because of motor failures . . . machines that are powered by Delcos. There are integral and fractional motors by Delco that *lower* costs in the only way that really counts — by *raising* production efficiency.

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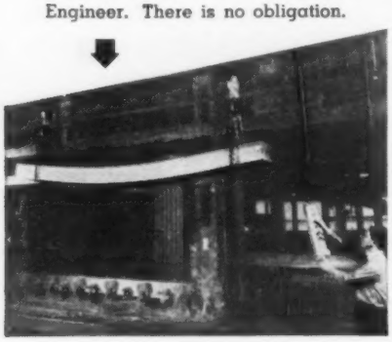
This method of engineering special handling systems, *at no extra engineering cost*, is standard practice with Reading. For full details on how you can use it to reduce handling costs and modernize operations, call in a Reading Engineer. There is no obligation.



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# Fatigue Cracks

By Charles T. Post

## Snowball

If you should be awakened about 3 a.m. some morning to find the yard full of friends with joy in their hearts and zero visibility in their eyes, don't say we didn't warn you. Quick as you can slip on your bathrobe and the wife her negligee, you'll be participants in the new game, "Snowball."

The game starts quietly and simply. All it takes to get under way is one couple bored with the idea of spending the evening at home. Unannounced, they drop in on friends, announce that a Snowball is underway. This calls for a drink on the house. Thereupon, the two couples take off for the home of another set of friends, where the performance is repeated, and the party adjourns to alight on a third unsuspecting household. The three couples then set forth. And so on. The only hazards are low liquor supplies and heavy sleepers who cannot be aroused. If the latter are encountered early in the evening, they can be deferred until later, when the Snowball has grown to major noise making proportions.

Snowball, we suppose, is the illegitimate offspring of a mating of progressive suppers and pyramid clubs. Should the influence of the latter become more pronounced in the conduct of the game, we can foresee a real threat to the serenity of even our most langorous towns and villages. The idea started in a New York suburb where tedium gave it a natural foothold.

On the normal fad timetable, Snowball should hit Chicago by Thanksgiving, and guarantee a Merry Christmas on the West Coast.

## Aptronym?

Edgar H. Bostock of Barnesville, Ohio's Watt Car & Wheel Co. says our aptronyms sometimes leave him puzzled, whereupon he reports on a church election in New Jersey of some years ago.

"Upon the membership list were a Mr. Black, a Mr. White, and a Mr. Greenwood. Mr. Black was first nominated for an office which he had to refuse. Then Mr. White was nominated and did likewise. Then someone suggested that as neither Mr. Black nor Mr. White would accept, perhaps Mr. Greenwood."

We regard this yarn as an insidious effort by the unpunished punners to move in on the exclusive Society of Aptronymists. According to the society's personnel handbook, members must be named Bishop, Elder or Sexton to be eligible for church office. And by the way, wouldn't the Watt company be an even greater success in the electrical equipment field than making mine cars?

## Bargain

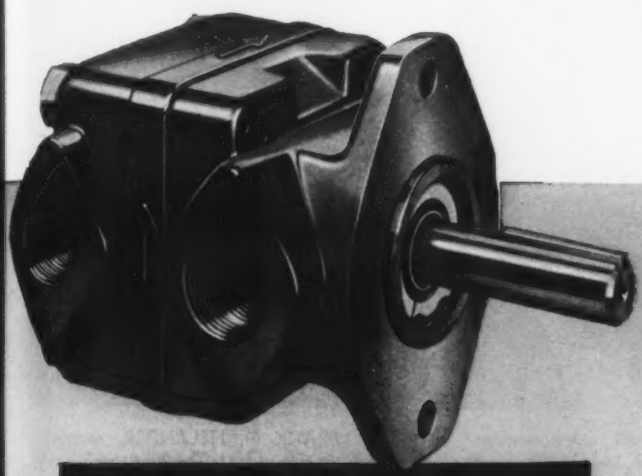
If you don't thoroughly appreciate what a bargain your f.f.j. is at $8 a year, consider the case of a Manila nail manufacturer. He pays the foreign subscription rate of $25 a year, but that's just a starter. In order to avoid being on tenterhooks over the price of manufacturers' wire during the 6 weeks it takes the issues to arrive, he has made arrangements with a radio company to telephone your f.f.j. once a month, get the latest prices, and "wire" them to him. Each monthly message costs about $7.50.

*Trun to Page 156*

# the pump designed SPECIFICALLY FOR mobile equipment service

# the NEW series V-200

# VICKERS
## BALANCED VANE PUMP



THE ONLY PUMP THAT AUTOMATICALLY MAINTAINS CORRECT RADIAL AND LATERAL CLEARANCES AT ALL TIMES

The rigorous job requirements of construction, agricultural, automotive and materials handling machinery have long pointed out the need for a hydraulic pump expressly designed for this service. The new Vickers V-200 Balanced Vane Pump has been designed and developed to meet these requirements with the usual Vickers high quality workmanship . . . all adding up to the "Best Pump Value" for this industry.

Longer life at maximum efficiency, far in excess of fixed clearance pumps, is assured as the Vickers Pump is the only pump designed to maintain both radial and lateral running clearances at all times. Not only is normal wear perfectly compensated, the pump even automatically adjusts its clearances to oil viscosity variations resulting from temperature change. As a result, correct clearances are maintained and more oil is delivered for useful work.

For many installations the nominal rated capacity of the pump is adequate, making it unnecessary to select the next larger size to provide additional capacity to compensate for loss due to high operating pressures, increased temperatures or normal wear. Thus, in many cases, a smaller pump can be used resulting in a more compact, efficient, and economical installation.

The tried and proven Vickers feature of "hydraulic balance" eliminates bearing loads resulting from pressure. The vane principle provides for no-load starting . . . important in cold weather cranking. Greater mounting adaptability is another advantage.

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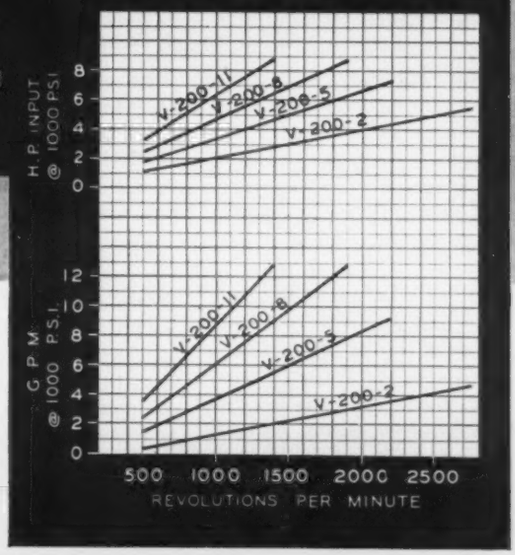


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# Iron Age *Introduces*

ARTHUR A. LESCHEN, president, A. Leschen & Sons Rope Co.

L. F. A. Mitchell, sales manager, Sperry Products, Inc.

FRANK G. HELANDER, executive vice-president, The Watson-Stillman Co.

**Arthur A. Leschen** has been elected president of A. LESCHEN & SONS ROPE CO., St. Louis. Since 1943, Mr. Leschen has served as vice-president in charge of production, and succeeds the late **William C. Henning. Douglas W. Vernon** has been named vice-president of the organization. He was elected vice-president in charge of sales in 1947, and in addition to his new duties will continue to direct the activities in the sales department.

**Laurence P. Quinlivan** has been named manager of air conditioning sales at the York factory, YORK CORP., York, Pa. Mr. Quinlivan was formerly industrial sales engineer of the corporation's Cincinnati branch.

**Lawrence M. Ricketts, Jr.**, has been elected vice-president and assistant treasurer of POOLE FOUNDRY & MACHINE CO., Baltimore.

**L. F. A. Mitchell** has been appointed sales manager of SPERRY PRODUCTS, INC., Danbury, Conn. Prior to his present position, Mr. Mitchell was manager of headquarters sales, Crocker-Wheeler Electric Mfg. Co.

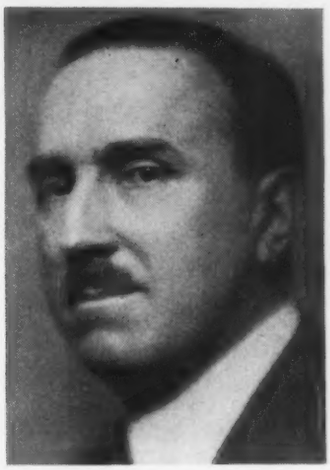
**Bertram Miller** has succeeded **H. L. R. Emmet** as works manager for the Erie Works, GENERAL ELECTRIC CORP., Schenectady. Mr. Emmet has retired after 36 years with the company. Mr. Miller was formerly assistant manager of the Erie works.

**H. Gottwald** has been appointed assistant sales manager, Nordstrom Valve Div., ROCKWELL MFG. CO., Pittsburgh. Prior to his present position, Mr. Gottwald handled the major part of the company's South American export accounts.

**Frank G. Helander** has been appointed executive vice-president, WATSON-STILLMAN CO., Roselle, N. J. Mr. Helander joined the company in 1943 as midwest sales manager of the Hydraulic Machinery Div. in Chicago.

**Harold H. Keays** has been made superintendent of products at the Los Angeles Lincoln-Mercury plant, FORD MOTOR CO., Dearborn. He was formerly superintendent of the trim department at the Detroit Lincoln Plant.

**Robert Krepps** has been made district sales supervisor, midwest area, DENISON ENGINEERING CO., Columbus, Ohio. Mr. Krepps has been associated with the company for the past 12 years, and until recently was sales engineer in the hydraulic pump and control division of the organization.



WARD A. MILLER, vice-president & director, Vanadium Corp. of America.

GUSTAV LAUB, vice-president in charge of sales, Vanadium Corp. of America.

R. H. TIMMONS, manufacturing manager, industrial products, Westinghouse Electric Corp.

**Ray H. Timmons** has been named manufacturing manager of industrial products, WESTINGHOUSE ELECTRIC CORP., Pittsburgh. Mr. Timmons has been with the company for 21 years, and was formerly manager of manufacturing for the company's transportation and generator division. **Edward G. F. Arnott** has been appointed acting research director of the lamp division, and succeeds **Charles M. Slack**, who has become technical director of the Westinghouse Atomic Power Div. **C. M. Clark** will succeed Mr. Timmons in the transportation and generator division.

**Henry M. Metcalf** has succeeded **W. K. Bonte** as chief industrial engineer, REPUBLIC STEEL CORP., Cleveland. Prior to his recent appointment, Mr. Metcalf was on the staff of the vice-president in charge of operations. Mr. Bonte has taken over new duties in the corporation's general accounting office.

**Ward A. Miller**, vice-president and director of the VANADIUM CORP. OF AMERICA, New York, has been placed in charge of administering and coordinating the activities in the company's selling and technical divisions dealing with commercial affairs. **Gustav Laub**, formerly assistant vice-president and general manager of sales, has been elected vice-president in charge of sales.

**B. J. Fletcher** has been named assistant chief hydraulic engineer, ALUMINUM CO. OF AMERICA, Pittsburgh. Prior to his new position, Mr. Fletcher was chief engineer in the company's development division.

**William Frame** and **J. D. Isaacks** have been elected vice-presidents of KEROTEST MFG. CO., Pittsburgh. Mr. Isaacks is in charge of steel valve sales, and Mr. Frame will serve in his former capacity of works manager, in addition to his duties as vice-president.

**Vernon M. Kraetsch** has been appointed assistant to the comptroller, AMERICAN STEEL & WIRE CO., Cleveland. In 1948 he was the Cleveland district works accounting supervisor, a position he has held up until his new appointment.

**Earl D. Needham**, formerly assistant purchasing agent in Des Moines, has been promoted to purchasing agent, SOLAR AIRCRAFT CO., San Diego, Cal. **Philip L. Ward** has been transferred to Washington, where he will be manager of the contract administration office. **John W. Parsons** has been named manager of the contract administration office in Dayton.

**Samuel F. Dubs** has been appointed chief metallurgist for MORRIS P. KIRK & SON, INC., Los Angeles. Since 1936 he has been superintendent of the Los Angeles plant.

**Joseph A. Orsino, George Vahrenkamp, Charles H. Moore** and **Edwin P. Peterson** have been transferred to New York where they have been appointed assistants to the director of research, NATIONAL LEAD CO., New York.

**R. H. Elder**, who served as a colonel with the Chemical Corps from 1942 to 1945, and has since been staff writer for the AMERICAN CAST IRON PIPE CO., Birmingham, has resumed his former position as chief chemist for the organization.

**James B. Brown** has been appointed secretary - treasurer, WELLAND ELECTRIC STEEL FOUNDRY, LTD., Welland, Ont. **M. Trotter** of the same organization has been named chief metallurgist.

**Robert N. Lynch** has been promoted to the position of sales manager, heat treating materials division, PARK CHEMICAL CO., Detroit. Mr. Lynch has been with the company for the past ten years working in the capacity of metallurgical sales and service engineer in the Michigan-Ohio territory.

**George W. Altman** has succeeded **E. W. Longacre** as plant manager of the Trent, N. J., cast iron foundry, THE NATIONAL RADIATOR CO., Johnstown, Pa. Mr. Longacre has retired due to ill health.

*Turn to Page 132*

# 3 important reasons why so many "If you use strip steel

## MANUFACTURED RIGHT!

Because Amerstrip is carefully and uniformly rolled, you can easily fabricate dependable parts that are light in weight ... completely accurate in size ... and that are low in cost, yet high in quality.

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You can get Amerstrip in the exact finish you want. For our finishing equipment, which is generally regarded as the finest in the country, can produce strip with *all* commercial bright finishes. These smooth, satiny finishes are certain to add a big "extra" to any product whose eye appeal is largely responsible for its sales appeal.

# for stainless sheet and strip

Automobiles were once designed as horseless carriages—even to the dashboard socket for a needless whip. Stainless steel production, too, once struggled thru horse and buggy thinking. More power, heavier rolls, more care in surface finish —and stainless sheet and strip came forth a step-child of carbon steel methods. Today's modern strip mills have changed this, giving stainless production new concepts of quality.

CRUCIBLE, one of the pioneers in stainless steel, has gone still further. Now, *for the first time*, hot and cold rolled stainless steel is made a *specialty product*, by specialty production methods, in a mill built specifically for this purpose—in widths from ½" to 50" inclusive, and in all gauges, grades and finishes.

This is more than merely another source of supply. For, with this new mill at the Midland Works and the Trent Tube Co. joining the organization, CRUCIBLE can now supply you with *every* form of stainless. And, in sheets, plates, strip, bars, tubing, forgings, wire and castings, you can rightly expect the best that modern facilities and generations of *specialty product* leadership can provide.

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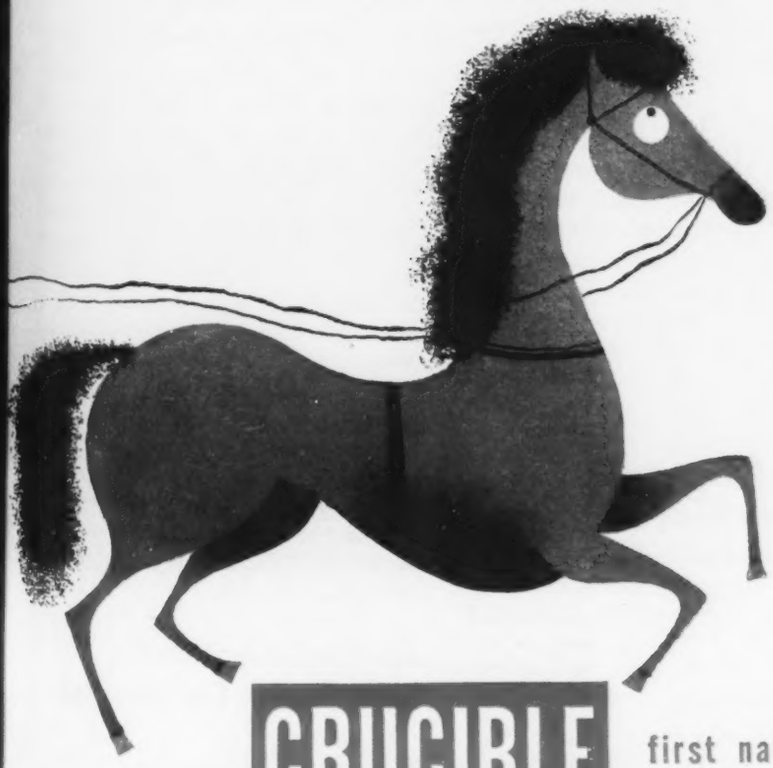

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# GLOBAL LETTER

## REVIEW OF WORLD MARKETS

**ECE steel committee shifts study from raw materials to markets . . . Brazil's heavy industries are increasing their output . . . New rate set for mark.**

**Geneva**—Members of the Steel Committee of the United Nations Economic Commission for Europe have decided to study measures to increase consumption of steel instead of continuing to look for ways to overcome shortages of raw materials. This decision was reached following a 3-day meeting here. The committee will also study possibilities of lowering production costs as a means of improving Europe's competitive position.

The change of thinking of this committee reflects the turning market for European iron and steel products. The bloom has long since left the lucrative export market. New currency exchange rates are expected to improve export business for some countries, as well as providing greater incentive for home consumption. But as this is written there are no concrete results of the recent financial manipulations of the various countries.

**Expects Better Fourth Quarter**

Still, there is more optimism than there has been in recent weeks. Mr. Tony Rollman, president of the ECE Steel Committee, said at a press conference that 'the bottom may have been reached and prospects for the fourth quarter of this year are for improvement." He said that world demand for steel will come to the surface again "when obstacles to trade are removed." "I believe," he said, "that some sort of convertibility will come, otherwise devaluation will be nonsense."

ECE experts said that coke and other raw materials required by the steel industry are now in sufficient supply. According to them, the difficulty now is to get rid of the steel.

### Brazil's Heavy Industries Recording Steady Progress

**Rio de Janeiro**—Total output of Brazil's heavy industry increased by 33.9 pct in 1948 when compared with 1946. A further increase of 10.4 pct was recorded during the first 6 months of 1949.

Exports of iron ore rose to 599,289 tons last year, compared with 196,737 tons in 1947. A further increase of 31 pct was registered during the first 4 months of 1949. Shipments through the port of Victoria, Espirito Santo, from the ex-British Itabira deposits accounted for 385,252 tons of last year's total.

The president of the state-administered Companhia Vale Do Rio Doce stated recently that the export policy of the Brazilian government now aims at increasing the output of the mines to the fullest possible extent, not only to increase exports of ores, but also to expand industrialization and increase exports of finished and semi-finished products.

**More Investment Needed**

This policy will necessitate carrying out a great amount of work in the mines, transportation services and ports. It will also call for large investments of national and foreign capital. It is proposed to build eventually a second railway line from Bello Horizonte, Minas Geraes, and connect it to a new port to be constructed at Aracruz, on the coast of Espirito Santo. This road would be expected to carry some million tons of ore and manufactured goods from the mines and mills to the coast. It would also transport national coal for the furnaces and factories of Minas Geraes on the return trip.

### New Rate Set for Mark But Export Price on Coal Unsettled

**Frankfort**—The new rate of 23.8¢ for one mark has finally been accepted by the West German Government, but the problem of export prices on German fuels remains to be settled. The official statement issued by the Allied

*Turn to Page 160*

# SPRINGFIELD

# LATHES

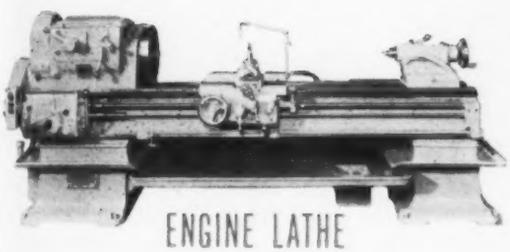
## Solve every lathe turning problem

Adaptability to every lathe turning problem and extreme versatility are characteristic of Springfield Lathes. Built with close precision and strict adherence to the highest standards for each component part, they are rugged, reliable, accurate performers on all types of work.

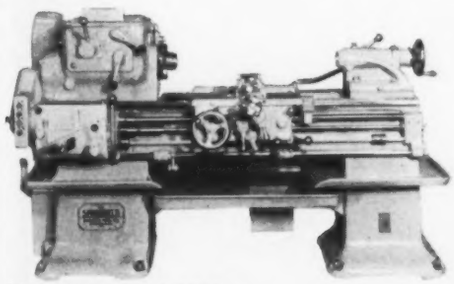
Anyone of the 16 speeds can be selected quickly and easily to meet the requirements of the tool and the work. Low speeds for heavy cuts or high speeds for carbide cutting tools are instantly available. The Springfield 3-lever speed shifting system reduces the amount of shifting required in the normal sequence of operations.

Sixty quick change threads and feeds give an exceptionally broad setting for many kinds of work. Threads such as 11½ and 27 pitch which usually require transposition gears are included in these ranges and the standard feeds and threads can be varied greatly.

Easy to set up and operate, these modern lathes are noted for their wide application and their accurate, sustained performance on all lathe turning work. Ask about their adaptability to your own turning problem. Springfield Lathes can solve them—and on a high production schedule.



ENGINE LATHE



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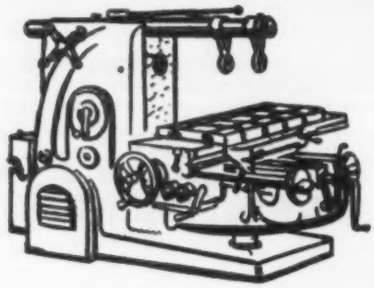


# MACHINE TOOL High Spots

## SALES, INQUIRIES AND PRODUCTION

by William A. Lloyd

**Sales and inquiries show improvement . . . Military aid program will benefit tool industry.**

**Cleveland**—Despite the nationwide steel strike, a slight improvement in machine tool orders was reported this week by major segments of the industry.

A few companies have reported orders from foreign customers, apart from ECA, in what is now recognized as an interim period when the industry at large expected no foreign orders other than ECA.

It could be that the predicted and overdue revival in the machine tool business is at hand. If so, continuation of the steel strike for several weeks would probably nip it in the bud. Thus far, no hold-ups have been received from steel-related companies.

### Sales, Inquiries Gain

A definite improvement during the last week of September was reported by several companies, both in sales and in inquiries. September order volume was spotty, but many companies did more business than they did in either July or August.

What the machine tool industry needed this week is what is commonly known as a good break. Devaluation of the British pound and the steel strike add an almost insuperable burden to the most aggressive sales plans.

The military aid program could be the break the machine tool industry needs. Map calls for $155 million in machine tools for foreign government arsenals and military installations. It is expected that most if not all of this money will be spent for U. S. machines. But the bill has not been signed by the President.

Furthermore, nobody seems to know who is going to handle the procurement. Also, the powers that be can't seem to agree on the definition of a machine tool. Nor can they get the foreign governments, who are the beneficiaries, to come up with a list of the machines they want, or even the projects they want to tool up.

### Foreign Business in Doubt

At present, the industry's backlog is about $75 million. Shipments are currently about $21 million a month. Nearly 60 pct of some companies' business is foreign, highest since 1938. With the props knocked out from under the foreign business by devaluation, some solution to the big price differential between U. S. and British machines is needed now. The more violent observers feel that the machine tool industry is being sacrificed to get England on its feet.

If no solution to the price differential is found, the outlook for 1950 is rather ominous. Some machine tool sales executives have already estimated that domestic business for the first quarter about 50 pct of the corresponding quarter of 1948, and foreign business no more than 60 pct. Bright spots are the extended British deliveries and the fact that some machines made here are not available in Great Britain.

### Detroit Suppliers Bullish

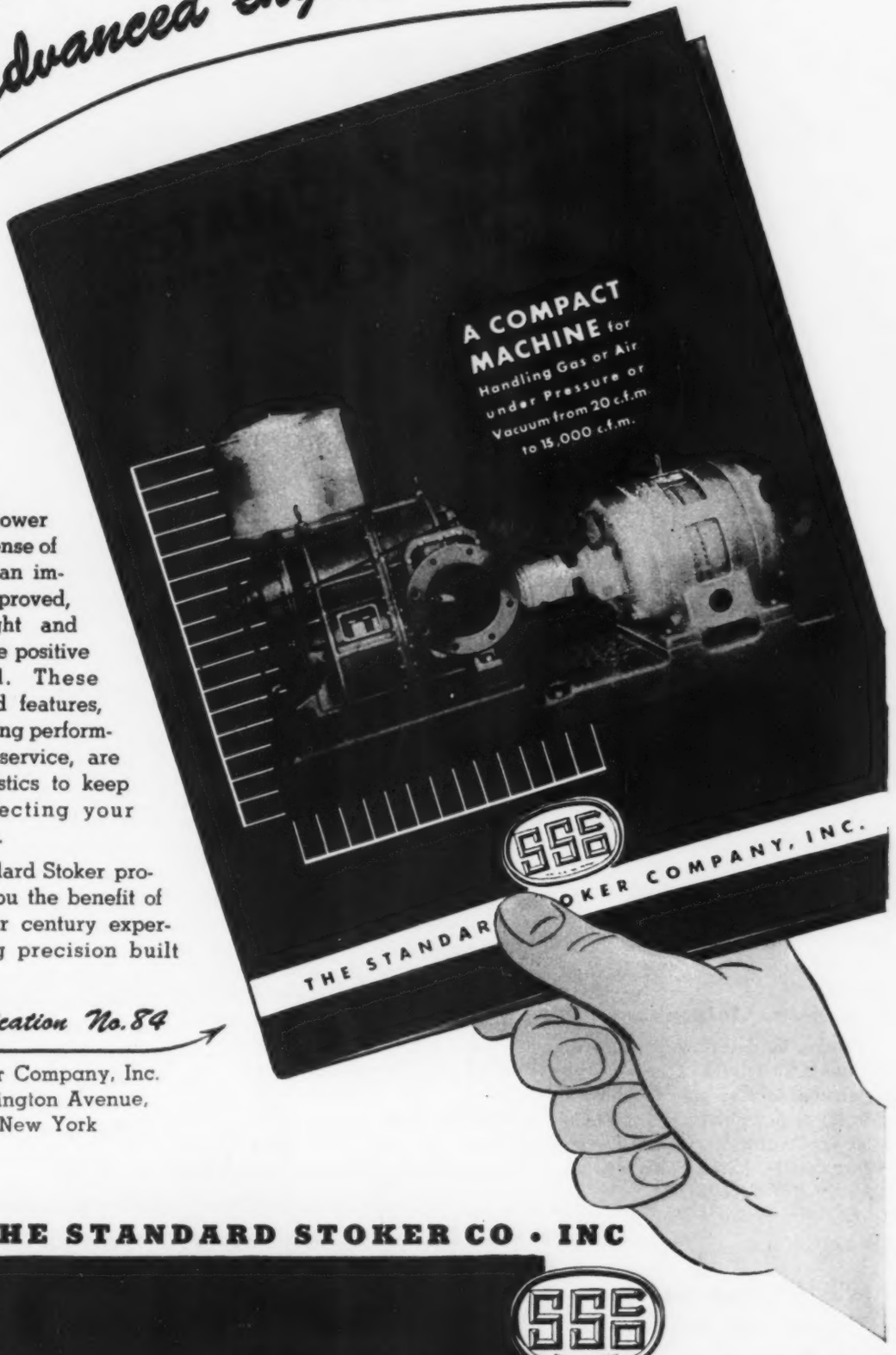
On the other hand, with demand for pensions in the air and apparently not to be denied, management's emphasis will necessarily be on cutting costs. It could be that pension plans will prove to be a very real bogey man in so-called technological unemployment. The incentive to employ less will have greater and more functional impetus.

In Detroit, machine tool suppliers continue to be bullish, although informed sources agree that basic reasons to sustain the prevailing optimism are difficult to find.

At the moment, the biggest program on the industrial front is a reported V-I engine program for Chrysler, which some sources believe may be as extensive, if it does not actually duplicate, the new Olds engine plant at Lansing.

# Here's a New Blower

## *with advanced engineering features*




The Standardaire Blower is modern in every sense of the word - it fulfills an important need for an improved, compact, light-weight and efficient blower in the positive displacement field. These carefully engineered features, plus superior operating performance and quieter service, are desirable characteristics to keep in mind when selecting your blower requirements.

In offering this Standard Stoker product, we also give you the benefit of more than a quarter century experience in producing precision built equipment.

*Write for Publication No. 84*

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Construction details, size specifications, and uses of Saran plastic lined steel pipe and fittings are described in illustrated 4-p. pamphlet. *Dow Chemical Co. For more information, check No.* 1 *on the postcard.*

### Loading Lifts

Illustrated bulletins 818 and 826 give information on the uses and advantages of tilting platform dock-loading ramps and lifts. *The Wayne Pump Co. For more information, check No.* 2 *on the postcard.*

### Boring Tools

Price lists, engineering details, and reference charts on single-point solid carbide boring tools are available in 8-p. bulletin. *Industrial Carbide Tool Co. For more information, check No.* 3 *on the postcard.*

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Catalog 50 describes engineering designs and details of bellows-type expansion joints; also included in this 20-p. pamphlet are its industrial applications, temperature and dimensional charts. *Magnilastic, a Divison of Cook Electric Co. For more information, check No.* 4 *on the postcard.*

### Abrasive Segments

The standard segment abrasive shapes, their uses and advantages, and selection charts for surface and machine knife grinding are described in 4-p. catalog, No. ESA-188. *Simonds Abrasive Co. For more information, check No.* 5 *on the postcard.*

### Lifting Magnet Controller

Lifting magnet controller catalog No. 905 describes new automatic-discharge controllers for all sizes, types, and makes of lifting magnets. *The Electric Controller & Mfg. Co. For more information, check No.* 6 *on the postcard.*

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Latest pamphlet describes details and applications of mechanical seamless, aircraft seamless, electric resistance welded, forged, and fabricated tubing. *The Ohio Seamless Tube Co. For more information, check No.* 7 *on the postcard.*

### Oil Coolers

Details, selection charts and graphs for the installation of B & G industrial oil coolers are shown in catalog V-1146. *Bell & Gosset Co. For more information, check No.* 8 *on the postcard.*

### Foundry Service

Description of Kennedy foundry facilities serving the industrial, railway, mine, smelter, marine, quarry, and general machinery fields is available in 24-p. brochure. *The William Kennedy & Sons, Limited. For more information, check No.* 9 *on the postcard.*

### Sandslingers

A new 36-p. catalog describes nine models of stationary Sandslingers and Speedslingers, showing photographs, specifications, and detailed drawings. *Beardsley & Piper Div., Pettibone Mulliken Corp. For more information, check No.* 10 *on the postcard.*

### Air-Ring Clutch

Bulletin No. 300, in color, gives 32-p. of engineering information, specifications, and ratings of air-ring clutches; bulletin No. 900 on package-unit clutch conversion is also available. *Fawick Airflex Co., Inc. For more information, check No.* 11 *on the postcard.*

### Rotary Gear Shavers

Bulletin No. 873-49 describes a line of completely automatic crossed-axis rotary gear shavers for finishing large spur or helical gears and involute splines by underpass, transverse or traverpass

*Turn to Page 142*

# The 2 largest Pyramids could be made from Billets Rolled last year . . .

THE TONNAGE of steel billets produced last year was about equal in volume to the two largest pyramids in the world. Together these two cover more than 24 acres of ground and rise to heights of 480 feet. Much of this tremendous tonnage was rolled on mills using rolls made by Pittsburgh Rolls with the familiar P.R.W. mark on the end of the wabbler.

Rolls with this mark have acquired a long-standing reputation for high tonnage and inherently longer life. Their performance can be expressed in few words: *less cost per ton of steel rolled.*

**PITTSBURGH ROLLS • Division of Blaw-Knox Company • Pittsburgh 1, Pa.**

# PITTSBURGH ROLLS

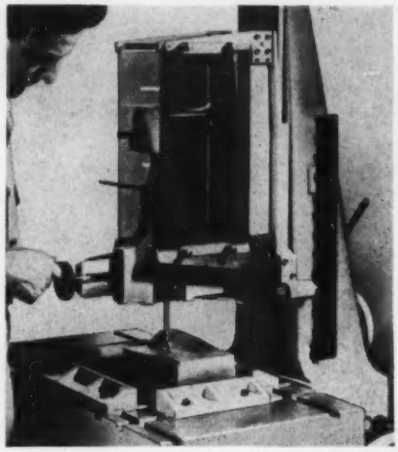
# NEW PRODUCTION IDEAS

*Continued*

end is a powerful magnet that picks up iron or steel particles that are not imbedded in the surface. The other end is a wire loop for non-magnetic particles. Each end is protected by a screw-on cap. *General Scientific Equipment Co. For more information, check No.* 32 *on the postcard on p.* 35.

### Contour Checker

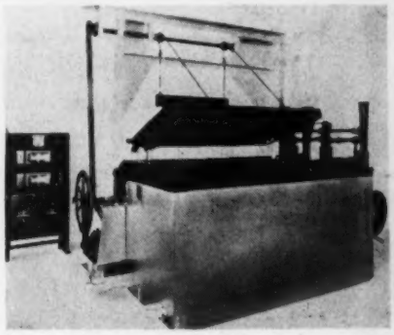
Fast, accurate visual gaging of compound curves, contour profiles, flash and striking surfaces of forming and forging dies and punches is possible with the Pant-O-Scriber die checker. Its basic principle uses horizontal and vertical preloaded ball bearing movements and a tracer roller. An adjustable and interchangeable follower, with 0.125 in. radius, is attached to one end of an arm, on the opposite end of which is a motor driven free



floating rotating spindle carrying a scriber cutter head. As the tracer moves across the die, the scribing cutter duplicates the movements, cutting the colored film from the tracer glass. As the column is indexed to the second gaging position, the tracer glass is indexed a known distance and the second section of the die is scribed on the same glass. Up to nine sections can be scribed on each glass. The glass plate is then placed on the measuring stage of a Vu-graph Delineascope. A master chart is positioned on this optical projection comparator and the scribed glass plate is placed in register with the master chart. Both glass and chart are simultaneously projected on a screen, the die contour and master in true relationship to each other. The unit can accommodate die blocks up to 800 lb and sizes up to 22x14x12 in. *Engineers Specialties Div. For more information, check No.* 34 *on the postcard on p.* 35.

### Descaling Furnace

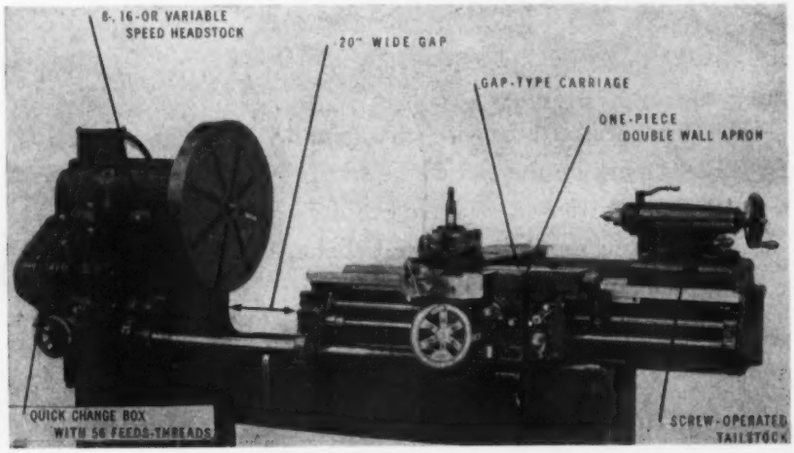
For descaling stainless steel parts a new salt bath furnace is portable, I-beam based, and can be fired with natural, artificial or any of the low pressure gases. The



welded steel bath is encased in a heavily insulated steel shell, is heated by two immersion tubes, and is operated at about 930°F. The immersion tubes are equipped with air operated eductors to insure proper travel of gases. A motor driven hinged lid covers the top and is arranged with limit switches and an up-and-down push-button station. It may also be operated manually. All burners are electrically ignited and have failure cutouts. Heat is regulated by an automatic temperature indicating control and over-temperature cut-out. *James H. Knapp Co. For more information, check No.* 35 *on the postcard on p.* 35.

### Sliding Bed Gap Lathe

A new medium-duty sliding bed gap lathe, built around the 17-in. Regal engine lathe, has a 20 in. wide gap that increases swing capacity from 17¾ to 30 in. and center distance from 38 to 58 in. Designated the 17/28 in. Regal, it can be arranged for a single-speed or a two-speed motor drive, or for the Gerbing drive. With the single speed motor, eight geared spindle speeds are available ranging from 20 to 425 rpm; with the two-speed motor, 16 speeds ranging from 10 to 425 rpm. With the Gerbing drive, it will deliver speeds ranging from 12 to 690 rpm. Design and construction principles include steel gears throughout headstock with spindle supported on anti-friction bearings, standard tapered spindle nose, quick change box with 56 feed-thread changes, one-shot lubrication to carriage, bed and cross slide ways, and inverted V-type bed. *R. K. LeBlond Machine Tool Co. For more information, check No.* 33 *on the postcard on p.* 35.

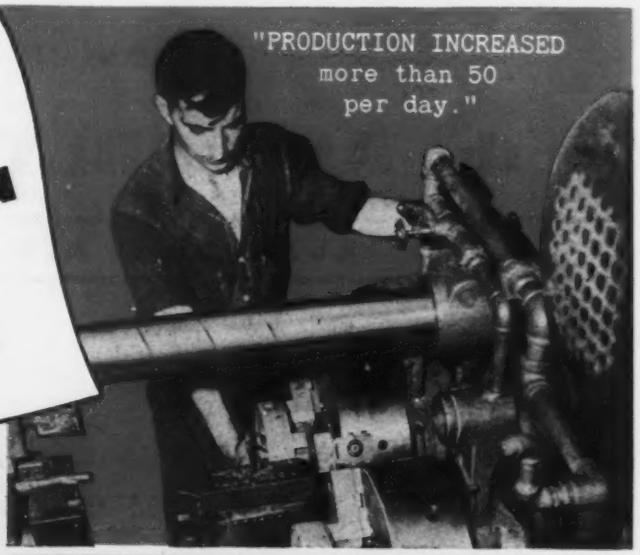



### DC Welder

Through the use of high voltage selenium plate-type rectifiers, a small, light and efficient welder

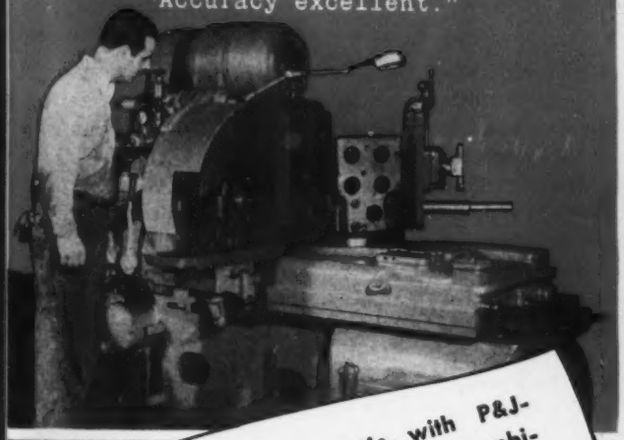
*Turn to Page 145*

# What Operators on the Production lines say about POTTER & JOHNSTON AUTOMATIC TURRET LATHES

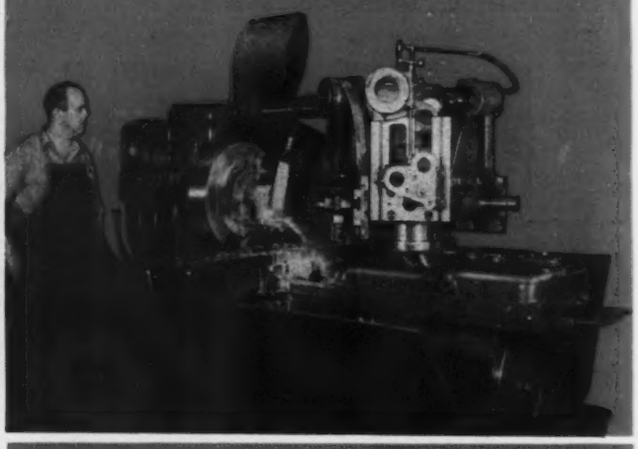


"PRODUCTION INCREASED more than 50 per day."

"RELIABLE, consistent production. Easy to set up. Easy tool adjustments. Accuracy excellent."

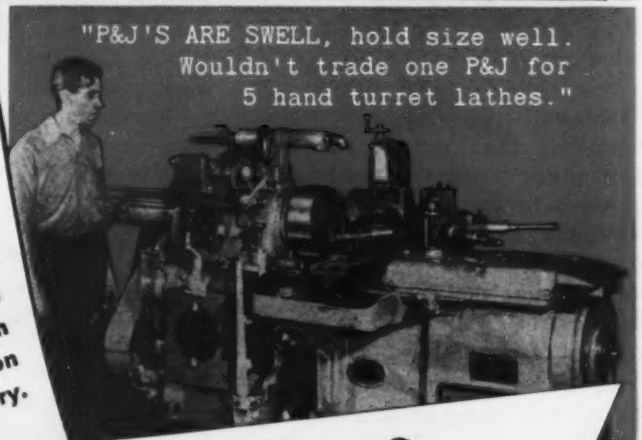


"GREAT IMPROVEMENT over ordinary turret lathes. Tool life very good."



Team-up any P&J Automatic with P&J-engineered tooling — and you have a combination that meets with conditions in any plant. Over 50 years' broad experience enriches P&J's highly specialized ability to attain the extreme versatility, precision and high speeds essential in today's competitive markets . . . and the ingenuity to design toolings to combine operations, reduce work handling to a minimum. This all adds up to fewer rejects in close-tolerance manufacture, and the greatest possible quality and economy in the quantity production of duplicate parts. A P&J estimate figured on your sample parts or prints will tell the story.

"P&J'S ARE SWELL, hold size well. Wouldn't trade one P&J for 5 hand turret lathes."



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**P&J AUTOMATICS...**

tooled for Production - Speed - Economy at Production Tooling Headquarters

# On the ASSEMBLY LINE

## AUTOMOTIVE NEWS AND OPINIONS

**Contractual matters hung up Ford agreement until the strike deadline was reached . . . Pension problems were also unsettled . . . K-F gets $34 million RFC loan.**

by Walter G. Patton

**Detroit** — An alleged "Inside story" of the Ford-United Auto Worker negotiations on pensions by a nationally known columnist purporting to show that the Ford agreement could have been reached "one week earlier" except for Walter Reuther's stalling is not widely credited here in Detroit.

It has been pointed out, for example, that the strike notice by the union was issued 10 days before the agreement was announced—not a week before as reported. This is only one of several factual errors in the columnist's easy-going conclusion about the Ford negotiations.

An important fact overlooked by this particular columnist is that there were many contractual matters to be settled—in addition to economic differences. These contractual matters dragged out until the final agreement was reached.

As one source close to the negotiations has pointed out, the fact that the parties agreed early "in principle" to the Ford pension offer did not mean that the union was willing to sign a contract embodying these principles. As a matter of fact, after the general frame work on pensions was accepted by both sides, the union brought up a number of specific cases of workers and insisted that Ford actuaries give in specific detail the workings of the pension plan in so far as these particular workers were concerned. In some cases actuaries had to dig down deep into their bag of figures to come up with an answer.

### Union Victory Dramatized

Informed sources agree that a successful conclusion of the negotiations looked promising as early as Monday or Tuesday. However, even after that time a number of knotty questions were raised. The question of temporary layoffs, for example, hung up the negotiations for more than 2 hr. Another item in the agreement—the downward revision in Ford steelworkers pay, may prove to be a bitter pill for Ford steel plant employees to swallow.

It is true that Mr. Reuther resorted to a certain amount of maneuvering in order to dramatize a union victory in the negotiations. Veteran labor observers who have been following the UAW-CIO for years have witnessed this sort of activity so many times that it is now accepted as an inevitable part of collective bargaining in the auto industry. For instance, at 1:30 p. m. on the day of the settlement, Walter Reuther wired all Ford locals to stand by for telephone instructions at 10 p. m. that evening. In his telegram, Mr. Reuther warned that there were certain questions still unresolved, implying that a strike was still possible.

Incidentally, it is true that the bill recently passed by the House increasing Social Security benefits will, if passed eventually by the Senate, decrease the amount of pensions paid by Ford to its workers. However, both sides were well informed about the pending House bill which came as no surprise. This gives credence to reports that both Ford and the UAW-CIO would like to see the pension issue settled by the federal government rather than by U. S. industry.

## K-F Granted RFC Loan; Will Introduce a Small Car

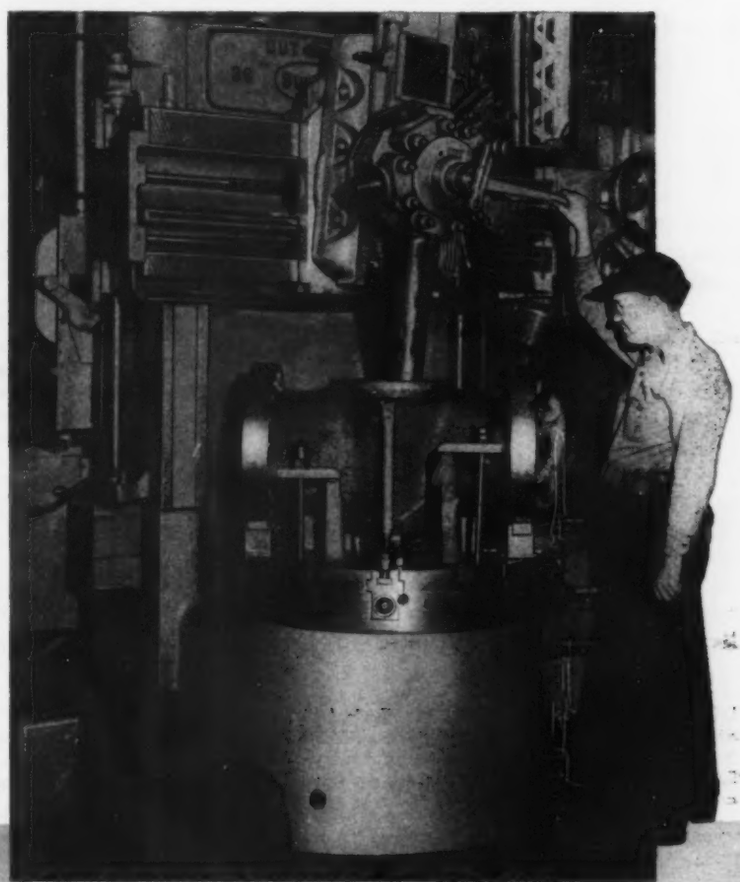
The conclusion that Kaiser-Frazer will be out day-after-tomorrow with a new engine and a new light car is somewhat hasty. The new $34.4 mil-

# the BULLARD CUT MASTER

## VERTICAL TURRET LATHE

**BULLARD** *Saves 2 Ways*

- 33-⅓% SAVED ON 3 OPERATIONS
- GRINDING OPERATION ELIMINATED



Bullard 36 inch Cut Master. Rigid enough to swing this large valve. Operations are taper bore, face flange and counterbore. 33-1/3 per cent time savings on three operations and because of the beautifully smooth finish, a grinding operation was eliminated.

## *Manufacturing Economies*

**This specifically illustrates the Bullard Cut Master adaptability to problem jobs. Naturally cumulative small savings in time, due to rapid and positive speed selection, limit stops for simplified dimensional duplication, centralized operating controls and high rate of rapid traversing add up to large savings on any work.**

**Also the rugged construction with large Timkin spindle bearings permits heavy feeds, thereby cutting time of operations. Rigid construction and screw feeds assure a high degree of machining accuracy resulting in minimum expense for spoiled work. All in all — Use Bullards for manufacturing Economies. Write for Cut Master Catalog XY-CVTL.**

**The Bullard Company, Bridgeport 2, Connecticut.**

lion loan granted to K-F last week by the Reconstruction Finance Corp. has undoubtedly been a great morale builder at Willow Run. Eventually, a smaller car than the present model and a car that is competitive with Ford-Chevrolet-Plymouth will be introduced. Henry Kaiser talked publicly about this car as early as August 1948. However, most observers feel there will be a considerable delay before K-F is able to get into production on the new model or models which are much needed to bolster the company's wavering sales position.

The new RFC loan is for 10 years at 4 pct interest. Reports indicate the government is asking for a guarantee on part of the loan and is taking a mortgage on the Willow Run plant and equipment for the remainder.

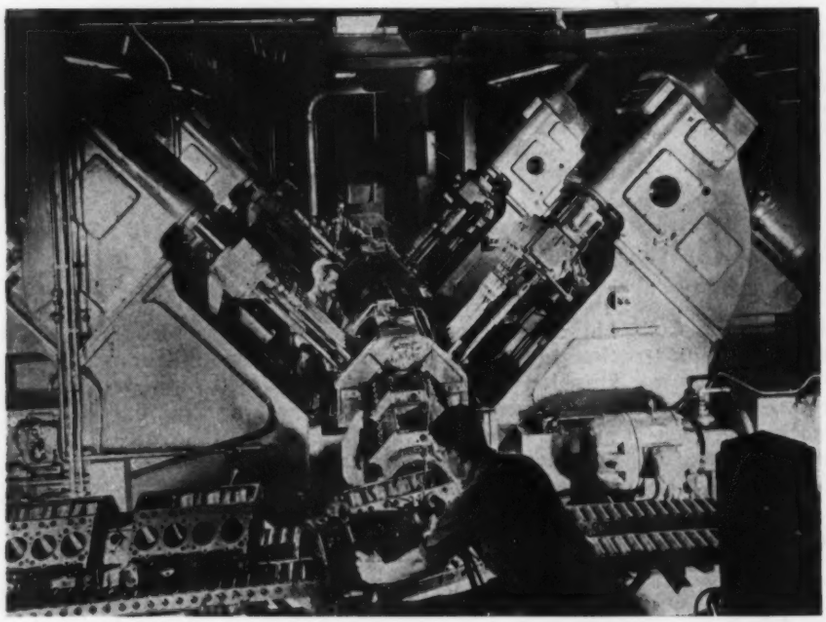
**Developing A New Engine**

Kaiser-Frazer is also reported to have a $20 million credit from California's Bank of America and the Mellon National Bank of Pittsburgh. It is not known to what extent this line of credit has been used. However, sources close to the company have indicated that the full credit has not been extended. This loan was granted in January of this year. Some of the proceeds of the new loan may be necessary to retire the present bank loans next year. However, it is understood the $20 million loan is not callable.

At the time of failure of its stock financing, K-F was close to tooling on a new engine. This engine was reported to be an L-head design. Since that time K-F engineers have been working intensively on high compression engines. There are no confirmed reports of the progress made in the Willow Run research laboratories. However, with the recent placing of tooling for new high compression engines by Chrysler Div. and Studebaker and the recent doubling of the Kettering engine plant at Lansing, the present trend in automotive power plants is clear. It is also evident that each of these engine tooling programs will cost many millions of dollars.

While a tooling job for a brand new engine comparable with the latest GM designs could be done possibly in a year, this would undoubtedly be the shortest time yet for completion of such a program. Simultaneously, K-F will have to build new body dies, try them out and get the new model into production. Assuming that K-F engineers are ready to go at this moment with a satisfactory new car and a new engine, it is reasonable to expect that October 1950 will be the earliest introduction date for a new and smaller Kaiser-Frazer model.

MODERN AUTOMOTIVE TOOLING: Typical of the modern transfer machines in use at the Kettering engine plant of Oldsmobile is this machine which sizes the cylinder bores of the 90° cylinder blocks and finish hones the cylinder walls to limits of 5/10,000 of an in. In the foreground, an inspector is using a special air-operated gage to test the bore sizes.



## Great Lakes Presents The Steel Strike to the Public

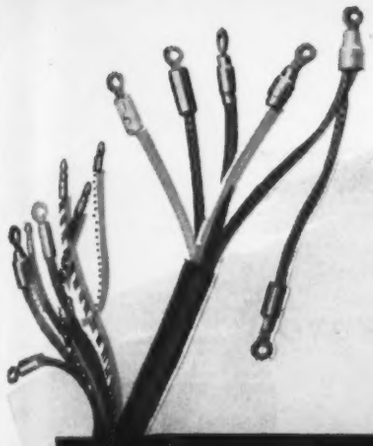
Great Lakes is not taking the steel strike lying down. In full page advertisements in the Detroit papers last week, the company is asking its workers and the public, "Does *this* make sense?" In the ad, Great Lakes shows pension benefits accruing to its employees in typical wage classifications. In each case the figures are for a worker operating on a 40-hr weekly schedule who is employed at age 30 and remains on the same job until he is 65.

According to Great Lakes, the lowest-paid laborer receives $212.79 per month. His monthly contribution to the Great Lakes retirement fund is $7. His monthly pension, including Social Security would be $128.29. Of this amount, $73.50 comes from the company fund.

In the case of a millwright, the employee pays $11 per month out of monthly earnings of $306.21. His monthly pension, including Social Security is $171.50. Of this amount, $115.50 comes from the retirement fund.

In the case of a heater receiving average monthly earnings of $638.20, the total monthly pension including Social Security is $392 of which $336 comes from the retirement fund.

Great Lakes also points out that under its pension plan, the employees can collect *both* his pay and his pension if he continues working after age 65. The plan is entirely voluntary and the employee can get his money back plus interest at any time. If retired by the company after 60 but before 65, the employee receives the full pension rate. After 5 years in the plan, the employee can hold the company's contribution by leaving his own contribution on deposit. At retirement, he receives a pension bought by the combined contributions.



# WIRING HARNESS ASSEMBLIES *by Auto-Lite*

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**Saves Assembling**
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**Auto-Lite offers complete facilities for designing and building wire assemblies. If you already use harness, send a sample with quantities and schedule desired. When a new design is needed, assistance is available from Auto-Lite engineers. Detailed information is contained in a free Auto-Lite Catalog. For your copy, write to**

**THE ELECTRIC AUTO-LITE COMPANY**
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TUNE IN "SUSPENSE!" . . . CBS RADIO NETWORK THURSDAYS . . . CBS TELEVISION TUESDAYS

# THE FEDERAL VIEW

## THIS WEEK IN WASHINGTON

**Commerce Dept. is quietly rearranging its commodity and industry divisions . . . Little chance seen for action on changes in Clayton Act.**

by Eugene J. Hardy

**Washington**—Business and industry should be pleased to learn that the Dept. of Commerce is quietly rearranging its various commodity and industry divisions. The changes will restore these divisions to the status they occupied for a quarter of a century until Henry Wallace, ex-Secretary of Commerce, reorganized the department several years ago. They will again make it possible to obtain foreign and domestic commodity information from a single source.

### Three Divisions Reorganized

It will be remembered that Mr. Wallace split the Bureau of Foreign and Domestic Commerce into five separate units, two of which were the Office of Domestic Commerce and the Office of International Trade. This resulted in duplication of effort regarding the work of the various commodity specialists and meant that businessmen could no longer obtain foreign and domestic information in the same office.

Commerce Dept. employees have resented the change from the time it was made, but W. Averell Harriman, who succeeded Mr. Wallace, was content to let the situation ride, despite its inefficiencies, duplication, and general wastefulness.

The present Secretary, Charles Sawyer, has not been pleased with this arrangement. In recent weeks, with the concurrence of the Budget Bureau and the Congressional Appropriations Committees, he has done something about it.

Three divisions, iron and steel, machinery, and construction, have been reorganized, once again combining the foreign and domestic activities in one office.

The new set-up will soon be extended to cover all the commodity and industry divisions, thereby ending the petty annovance of running from office to office.

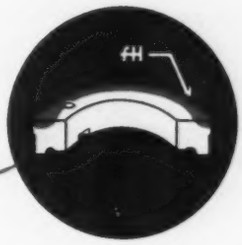
### Will Report on Iron, Steel

Perhaps more important is the new emphasis that is being placed on getting into the hands of business, in usable form, the mass of information on foreign markets, production, etc., that flows into the Commerce Dept. from U. S. embassies throughout the world. This work had been neglected to a considerable extent by the Office of International Trade, which has been occupied primarily with export control matters during the past few years. It is this sort of trade promotion activity, which reached its peak when Herbert Hoover was Secretary of Commerce, that Secretary Sawyer hopes to revitalize.

In the newly-organized Iron and Steel Division, headed by Frank McCue, work is proceeding rapidly to complete the reconsolidation. One of the first projects to be undertaken is the preparation and issuance of an Iron and Steel Industry Report. This will be issued quarterly and the first copy will be dated December 1949. It will be similar to other industry reports now being issued by the department covering a variety of commodities. The report will emphasize foreign activities, covering facilities, production, and consumption. It will also contain statistical coverage of the domestic industry. There will be a market summary and at least one feature article per issue.

Other points to be covered include domestic facilities, production and consumption, as well as raw material consumption, re-

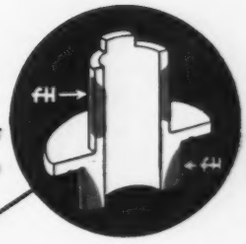
oil pump valve




clutch adjusting nut

drive shaft

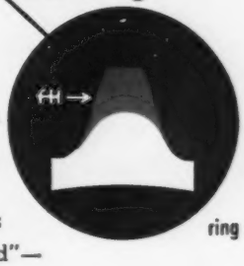
torque converter hub




# fh the new symbol

## for faster, more economical surface hardening

torque converter internal cam




ring gear

On your part prints or assembly drawings . . . wherever you want to specify hardness values and patterns **and be sure of getting them . . .** write "fh." It's the new symbol for "flamatic hardened"—the term that made hot news at the last two Metal Shows with starter ring gears and torque transmission cams held to closer specs at higher speeds than ever before.

At this year's Metal Show, flamatic hardening, with electronic control, does it again, demonstrating in actual production how "fh" puts the right hardness in the right place in pipe wrench jaws—and opens up a promising new field of applications. **By all means,** see the Flamatic demonstration at the Metals Show. Or write for new booklet on how Flamatic hardening makes better products **cost less.**

**Booth 1826**
**ational Metal Show**
**October 17-21**

hook roller

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# flamatic

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sources and requirements. Technical developments will also be included. Such a publication will give a bird's-eye glimpse of America's basic industry to a wide range of people whose interest in the industry is only indirect.

## No Change Seen on Clayton Act Before Senate Adjourns

Reported puzzlement over the lack of opposition to legislation amending the Clayton Act so as to prevent business firms from buying the physical assets of their competitors is sheer nonsense. While such opposition has not been substantial or vocal during the past few weeks, there are a number of good reasons for this situation. The most important of these is the fact that there is little chance that the Senate will act on the House-approved bill prior to adjournment.

This perennial measure has been urged by the Federal Trade Commission for almost 25 years. But Congress has never granted the power to block acquisition of assets, although the Clayton Act already empowers the FTC to block acquisition of competitor's stock where the effect might be "substantially to lessen competition."

It can, therefore, be readily seen that with little chance of passage during the current session, businessmen quite justifiably are concerning themselves with more immediate problems that are bedeviling them in the Nation's Capital.

### Hearings Have Been Brief

Hearings on the measure have been undeniably brief, but this is largely because preceding Congresses have held exhaustive hearings on similar legislation. A House Judiciary subcommittee which held hearings earlier this year, prior to House approval, heard 7 witnesses and received 6 statements. Of the 7 witnesses, 6 favored the bill, but these were all representatives of government agencies and members of Congress who have never been too interested in the real needs of business. The other witness, an anti-trust attorney in private practice, opposed the bill. Two members of Congress and a CIO union filed statements favoring the legislation, while three statements from trade associations asked that the measure be defeated.

On the Senate side, the Judiciary subcommittee has heard 16 witnesses. Nine of these favored the bill, 8 were the same members of Congress and representatives of the FTC and Justice Dept. who favored the bill during the House hearings. A representative of an eccentric small business organization also appeared in behalf of the legislation, and a shipping industry representative offered no objection so long as shipping was excluded. Six industry and trade association representatives flatly opposed the bill.

Summing up, the only real support for the measure has come from government officials who have lobbied for it for many years. Only business support came from an unimportant association of small businessmen. All other business witnesses, representing such organizations as the National Association of Manufacturers, Cotton Textile Institute, and the Commerce and Industry Association of New York, reiterated their opposition.

THE BULL OF THE WOODS — By J. R. Williams

BUT, LADY, IT'S A MILE UP TO THE GEAR ROOM! IS THAT VERY IMPORTANT?
OH, KIND SIR, THEY'RE FORECLOSING ON OUR CHAISE LONGUE! IF HE DON'T SIGN THIS AT ONCE--
THAT'S SOME OF TH' NIGHT SHIFT JUST PASSIN' BY FROM A FISHIN' TRIP! IF THEM JOKESMITHS DO THAT WHEN THEY'RE OFF, YOU KNOW WHAT THEY DO WHEN THEY'RE ON!
HEE HEE
SH-H-H.
10-14
J.R.WILLIAMS
T. M. REG. U. S. PAT. OFF.
A PASSING THOUGHT
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## May Head Pricing Bill

Possibility of a negotiated settlement in the Federal Trade Commission's price-fixing conspiracy case against the steel industry has taken on added importance. With Congress about ready to close up, possibly within a matter of days, it does not appear likely that suitable delivered price legislation will be enacted, unless supporters of a moratorium on new delivered price cases can ram such legislation through in the closing days of the session.

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The machine is equipped with twelve vertical drilling spindles, two vertical reaming spindles, four vertical tap spindles and one horizontal drill spindle all of which operate simultaneously on a work piece as it is indexed from one position to another. Aside from hand clamping all operations are automatic and operator merely presses a button at the start of each cycle.

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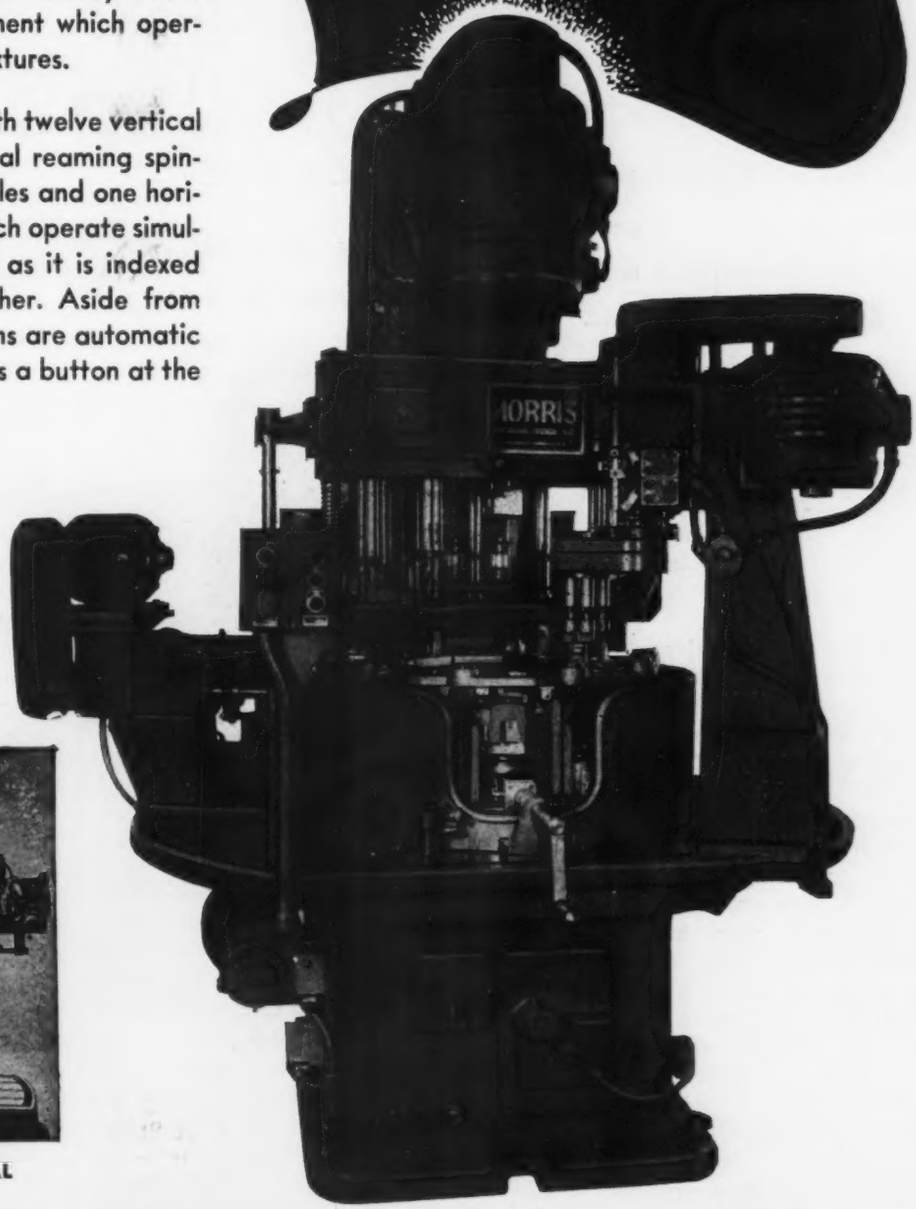


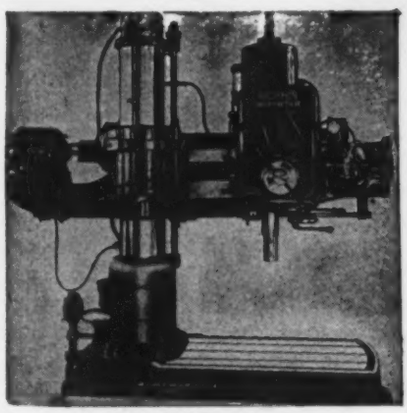

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The MORRIS Machine Tool Co.
CINCINNATI 3, OHIO

# WEST COAST PROGRESS REPORT

**Western steel production and stocks on hand are generally adequate to weather a 30-day strike without curtailments.**

**Digest of Far West Industrial Activity**

by J. P. Reinhardt

**San Francisco**—With some few exceptions steel users of the West aren't losing too much sleep over the immediate effects of the national steel and eastern coal mine strikes.

There are several explanations for this complacency. Probably the most important is that while the country as a whole was operating at 8 pct of capacity last week, ingot production in the West was being maintained at approximately 20 pct of capacity. Another comforting thought is that western coal miners are going back to work and that the blast furnace now operating at Fontana is assured a coal supply and those at Geneva, now strike-bound, will have coal when they are again in production. Still another factor is found in the heavy inventories most warehouses had on hand at the time the strike was called. It is also apparent that most fabricators were prepared for the cutoff of supplies and except for some specialty items consider themselves in good shape.

#### Kaiser Continues Operations

The relatively high rate of steel production in this area is accounted for through the continued capacity operation of Kaiser Steel Corp. facilities at Fontana, Calif., which can produce approximately 1 million tons of ingots per year; normal operation of Pacific States Steel Corp. at Niles, Calif., with a capacity of approximately 78,000 tons of ingots per year; near capacity operations at Judson Steel Corp. at Emeryville, Calif., of approximately 76,000 tons of ingots per year; full operation at Oregon Steel Mills, of Portland, Ore., with a capacity of approximately 80,000 tons per year and near capacity of the Northwest Steel Rolling Mills at Seattle which can produce approximately 28,000 tons of ingots per year.

Of course the subsidiaries of U. S. Steel; Columbia and Geneva are closed down tight; and Bethlehem Pacific Coast Steel Corp.'s plants are out of production.

## Steel Supplies Adequate With Possible Price Increases

**Los Angeles** — Healthy stockpiles in warehouses of steel users and the signing of a new contract with the CIO United Steelworkers by Kaiser Steel Corp. apparently assures most of southern California sufficient steel to continue operating at full pace for at least 30 days.

Some new strikes are in the offing at midnight Oct. 14, however, when several other steelworker contracts expire. Largest plants to be affected would be the two belonging to U. S. Steel, Boyle Products, which manufactures sheet-metal containers and garden tools, and Consolidated Western Steel Corp. which fabricates 30-in. pipe and does construction work.

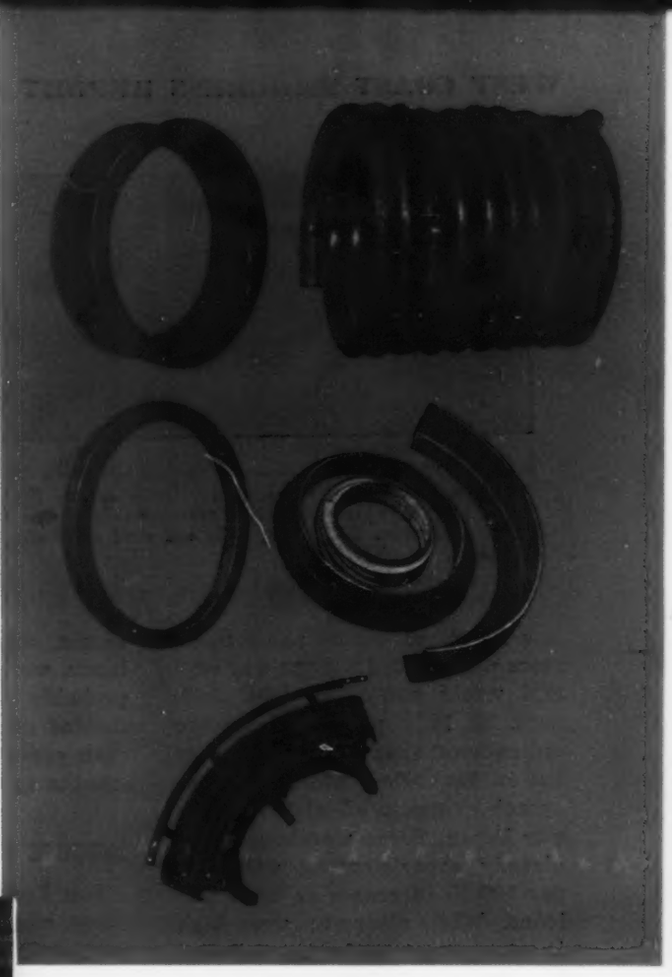
#### Price Increases Possible

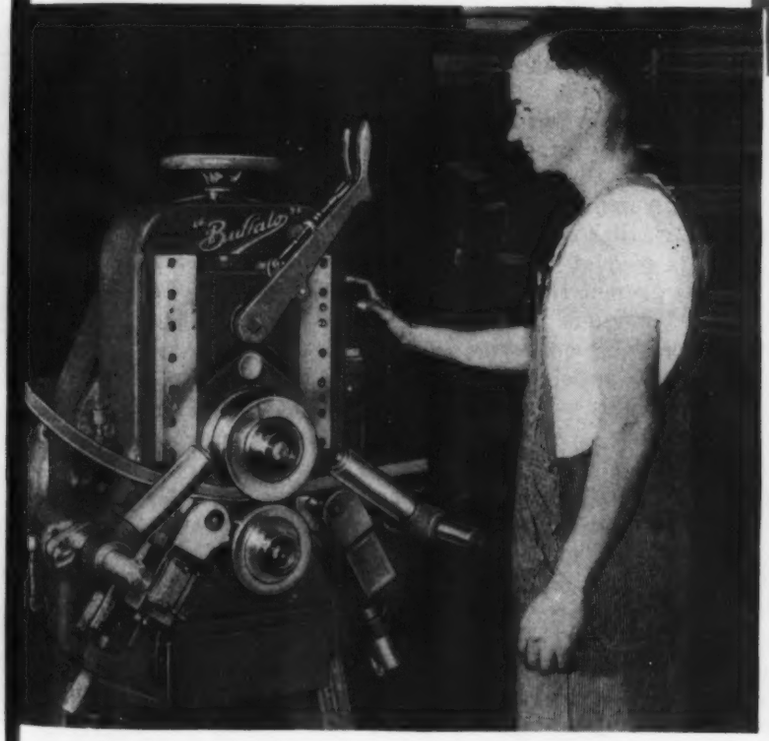
Kaiser's new contract which sets aside 10¢ an hr per employee for pensions and a health program affects 3500 employees. The contract calls for 6¢ for pensions and 4¢ for the health plan as outlined by the fact-finding board. It is recalled that during the last steel strike the Kaiser organization was one of the first to sign. It is generally conceded that continuing operations of this plant will afford Kaiser an excellent opportunity to extend his customer list and generally improve his position in the trade.

One side effect of the steel strike is that as demand on the warehouses increases, there are a

## NO CHEAPER METHOD OF

# *Rolling Out Curved Shapes*



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DRILLING PUNCHING SHEARING CUTTING BENDING

GROWTH CONTINUES: Shown is the interior view of the new Pacific States Cast Iron Pipe Co. plant at Provo, Utah. The plant has a capacity of 100,000 tons of pipe a year. The super deLauvaud process—casting pipe in a revolving, water-cooled metal mold where the pouring ladle and mold are stationary—has been installed in the plant.

few red faces among those operators who started a price war several weeks ago (THE IRON AGE, Sept. 29, 1949, p. 44). There are indications that price increases are in the offing which will approach prices in effect before the war began. Some warehouses are already experimenting with 30¢ per 100 lb increases as trial balloons. While stockpiles were high in warehouses, early runs lowered the supply of light-gauge sheets while shapes and bars were abundantly available.

Because of their dependence on hundreds of small parts manufacturers, auto assembly plants here were uncertain as to how long they could continue to operate. Ford and Lincoln Mercury officials said they believe they can continue for from 45 to 60 days because of large stockpiles. A steel shortage by a small supplier however could change the picture unexpectedly.

At the General Motors assembly plant officials were a little less certain because more of their parts come from the East. They keep on hand a 5-day supply, however, and have at least 10 days' supply coming from the East uninterrupted.

Most fabricators also had large stocks on hands. Where contracts were made on mill delivery, however, they notified customers of the strike and began inquiries as to whether the customers would want to pay the higher price necessary to purchase certain items from jobbers when shortages appear. Oddly enough, wide flange beams, once among the shortest items, were plentiful in this area, probably because many were overstocked as orders were filled faster than expected by the mills a few months ago.

## Supplies of Sheets Limited

**San Francisco**—Users of galvanized steel sheets will probably be the first to feel the pinch as their stocks decline. Major dependence for this product locally has been placed on the new facilities of Columbia at Pittsburg, Calif., and it is apparent that warehouses will probably be cleaned out of this product within a few days at the present rate of buying. Both the hot and cold-rolled strip will probably be next to disappear and it is anticipated that a shortage of plates will develop rather soon.

Kaiser is the only plant operating which produces plates in the West and at the present time that company is supplying approximately 25,000 tons a month to Consolidated Western Steel Corp. for the fabrication of pipe for Transcontinental Gas Co. At full capacity this plate mill can turn out approximately 410,000 tons per year which means that already about three-quarters of its capacity is committed to the pipeline job.

Structural shapes are not likely to be tight within the next 30 days except for wide flange beams. It will be recalled that demand for structurals had fallen off several months ago to the point where Geneva had ceased producing them. While the market was not glutted, demand was at a low ebb until just before the strike when fabricators and warehouses began stocking up rather heavily.

The San Francisco Bay area warehouses are in a peculiarly favorable position because at least eight of the larger houses had been closed by a strike for 110 days and opened up only last week. With heavy stocks in those houses and all others carrying relatively high inventories, their customers should experience little difficulty in obtaining most items for the next 30 to 60 days.

## Fabricators Have Ample Supplies for 60 to 90 Days

**Salt Lake City**—Except for fabricating jobs requiring special steel alloys or sizes, fabricators here can ride the steel strike out for 60 to 90 days without seriously curtailing their own operations.

Chicago Bridge & Iron Co. has a 90 day supply of steel on hand. The Lang Co., Inc., can operate at least 50 days without laying off men. Structural Steel & Forge, Eimco and American Fabric Co. have stocks for from 60 to 70 days.

An outbreak of strikes among fabrication firms is not anticipated inasmuch as most of them have contracts running into next year. The exceptions include Eimco, which is currently negotiating with the International Assn. of Machinists; Pacific States Cast Iron Pipe Co. at Provo, which is operating under a temporary contract extensive to Oct. 26; and the Ogden Iron Works which is scheduled to start negotiating with the United Steel Workers of America within the next week or two.

One fabricator took an optimistic view of the steel strike provided it doesn't continue beyond a few weeks. As he expressed it: "Things were getting pretty loose in the industry around here and a strike of a few weeks will serve to tighten things up a bit."

# Stamping Expedites Steel Burial Casket Output

By W. E. BARROTT, JR.
Factory Manager,
Aurora Casket Co., Inc.,
Aurora, Ind.

**Summary: The number and speed of operations normally required have been reduced by the logical application of a hydraulic press with appropriate dies that rapidly draw, form, trim and pierce components of steel burial caskets. A welded assembly has proved much stronger than the previous method of soldering joints.**

A CHANGEOVER in the production methods of manufacturing burial caskets from more or less a hand operation to a mechanized method has made possible a reduction in the number and time of operations required, with a resultant lowering in labor costs in forming as well as assembling the product. While Aurora Casket Co., Inc., Aurora, Ind., has been manufacturing steel burial caskets for many years, relatively little stamping press equipment had been used until recently. Components were formed mainly on press brakes or in rolls.

Recently a 500-ton hydraulic press, shown in fig. 1, was installed, along with the necessary dies that draw, trim, and form the casket components rapidly and economically. The beneficial effects of this change in manufacturing technique are illustrated in fig. 2, where the operations required by both the old and new methods are listed. These diagrams show sections through the major components of a casket assembly, all of which are made of 20-gage steel. Old and new components are nearly identical in section and design, but the new ones are produced in fewer operations. The new HPM hydraulic press, built by the Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, has a maximum die mounting surface of 120x60 in. Daylight opening between the slide and bolster plate is 60 in., and maximum ram travel is 42 in. The press is a single-action Fastraverse type, with a 200-ton hydraulic die cushion located in the press bed.

Body portions of the caskets are made in four sections—two sides and two ends—all identical in sectional shape, being flat at the center band and curved to form integral curved moldings at

top and bottom. Each section is serrated at the ends of flat portions to provide dovetails. Where ends and sides join, the dovetails interlock and are bent over at assembly to form strong joints. At the curved moldings there are miters that butt initially that are arc welded.

Upper portions of caskets include what is now a one-piece drawn top panel and an open frame, called an "OG," made from four more or less C-shaped portions, two sides and two ends, welded at mitered joints. After assembly, the panel closes the opening in this frame to which it is later spot welded.

For the casket bottom, a single stamping with stiffening ribs is now used. Formerly, this bottom was provided with three stiffening cross ribs only, formed singly in a mechanical press opposite slots cut in the edges of the blank. Now, this bottom panel is stamped in the HPM press that not only produces all of the stiffening ribs but also flanges all four edges. This provides a stiffer bottom and one that can be made commercially only in a large press. As shown in fig. 2, the new bottom saves extra bends on sides and ends of the body portion to which the bottom is spot welded.

The old method of making top panels was to cut fishtails out of each end of an oblong blank, arch the blank in a roll, and flange the side edges inward in a brake. Triangular pieces cut from the ends were similarly rolled and flanged and then put back to close the fishtail notches. This required four diagonal joints that were arc welded. In the present Aurora panel, there are no joints, as the panel is drawn and flanged in one piece in the HPM press. This saves much labor, not only because drawing and forming constitute fast operations, but because there are no diagonal joints to be joined and then dressed smooth.

Drawing of the panel is done in one operation, as shown in fig. 3, that leaves a beaded draw flange all around. In the second operation, the outer part of the flange, including the beads, is sheared off leaving a ¾ in. flat all around. Next, the piece is put back in the first die and the flat flanges are formed so that they are at right angles to the die parting. Finally, the panel is placed in a cam die that forms the flanges inwardly parallel to the die parting. On the up stroke, the cam controlled portions of the die move inward so that the finish formed panel clears and is lifted out. This is shown in section in fig. 2.

Bottoms are formed in a single die, as shown in fig. 4, that produces 19 stiffening beads, and flanges the edges in a single stroke. When this forming is completed, punches are advanced and pierce twelve ¼-in. screw holes, the screws being used to fasten two wood strips to the under side of the bottom. Forming and piercing the bottom in this manner saves many operations over the method formerly used, and a stiffer bottom is obtained and extra operations on sides and ends of bodies are saved.

As fig. 2 indicates, each side member and each end member of the body portion, after blanking, required six forming operations in the brake when made by the old method, as illustrated in fig. 5. These operations needed two men to handle each side piece six times through the brake, two different sets of special brake dies to form the curved sections, and standard dies to form the other bends, including those nearest the bottom edge not required with the new style of bottom. Each set of dies had to be set up for each run of parts through the brake. About 322 side sections could be produced by two men in 8 hr. One man could run 322 end sections in 8 hr.

In contrast, the hydraulic press, using a man to load blanks at one side and a man to remove the formed pieces at the other side, completely forms one side and one end piece in each working stroke of the press, or a total of 1200 sides and 1200 ends per 8-hr day. Thus, it now requires only 15 pct as many man-hours per set, consisting of one end and one side.

For brake or press work, both ends of blanks have to be sheared to contour, including dovetailing, before forming. Hence, neither has any advantage on this score. The blanking is done in a small press using a die having removable sections, as the dovetails on ends have to interlock with dovetails on sides.

In the case of side and end sections of the OG,

FIG. 1—A drawn and trimmed top panel for a casket is being removed from a 500-ton hydraulic press.

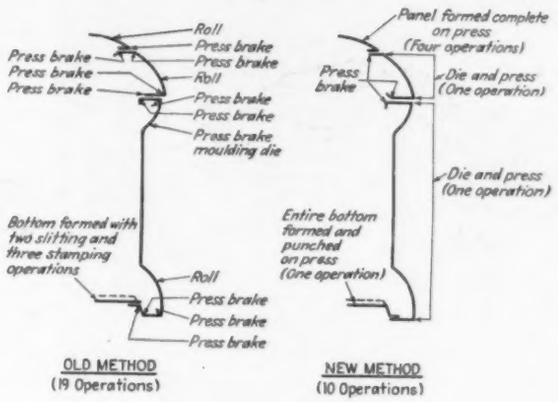



FIG. 2 — Transverse sectional views show the steel caskets produced (left) by the old method using chiefly rolls and brakes and (right) by the new method in which major operations are performed on an hydraulic press.

the lower section of cover, the situation more or less parallels that just described, except that when rolls and a brake were employed for forming, five operations were needed, as shown in fig. 2. In the new setup, one end and one side for an OG are formed in a die in the HPM press, but each piece then requires two brake operations to form the flange along each edge. If the flanges were formed on the press, they would not clear the punch unless it was made collapsible. Nevertheless, the die saves two brake operations per piece.

Whether components are made by the old or by the new method, assembly operations are nearly the same except that since the top panel is formed in one piece, the corner joints that formerly had to be made are eliminated. What are termed *half couch* type caskets require that the panel be sawed into two and filler plates are added at the cut end of each half. This is the same in both old and new types, except that a latch hole pierced in the press formed parts is pierced with a hand tool in the older type.

Assembly of casket bodies starts with interlocking the dovetail of two side sections with those of two end sections and then hammering over the ends of the dovetails. Joints are strong but applicable only to the flat portions of the ends and sides, and they draw the edges of the curved moldings together while two arc welds are made at each corner of the assembly. Enough metal is added to make sure that when the welds are dressed with a flexible grinding wheel the mitered joints are square and without blemishes.

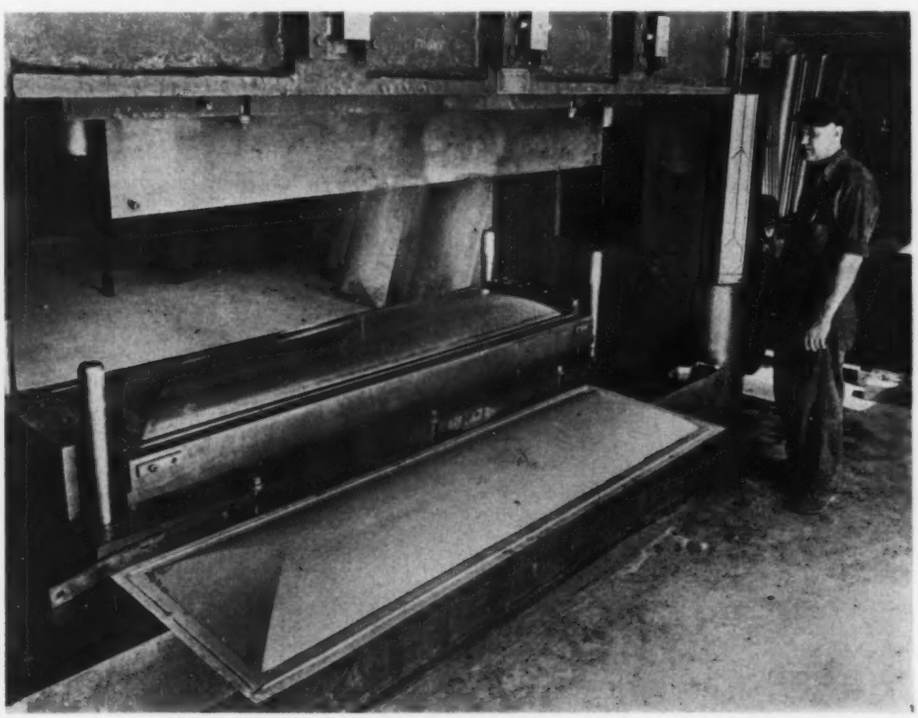


FIG. 3—This is the top panel of the casket after drawing in the die shown in the press. Depth of draw is 3¾ in. and production averages 150 per hr. The same die with added parts performs subsequent trimming and flange forming operations.

FIG. 4—Bottom panel of the casket is formed in a single press operation that includes drawing the beads and forming the flange on all sides. This part is drawn to a depth of 2 in. at a rate of 165 per hr.

Although the bent over ends of dovetails have an unfinished appearance outside, they are covered subsequently by corner hardware and do not show when the casket is completed. The joints strengthen and stiffen the casket body, which is further stiffened by the welds above and below the dovetails at each corner. Further stiffening is attained when the bottom panel is spot welded to bottom flanges of the body sides and ends. These spot welds are not exposed to view in finished caskets and require no dressing.

A stiffening brace is also applied by soldering at each inside corner, each brace joining the dovetailed corner to the bottom. Although these braces could be spot welded, soldering is adequate and leaves no spots to be dressed off.

Lower sections of covers, when made into a one-piece frame, require an arc weld at each of four mitered corners after which this frame is spot welded to the top panel at internal flanges that are hidden in the final assembly. In half couch type caskets, the cover panel is sawed in two transversely and arc-shaped filler pieces are soldered along the cut to give a finished inner end on each half. Side portions of the OG are also sawed in two and the lower pair of halves

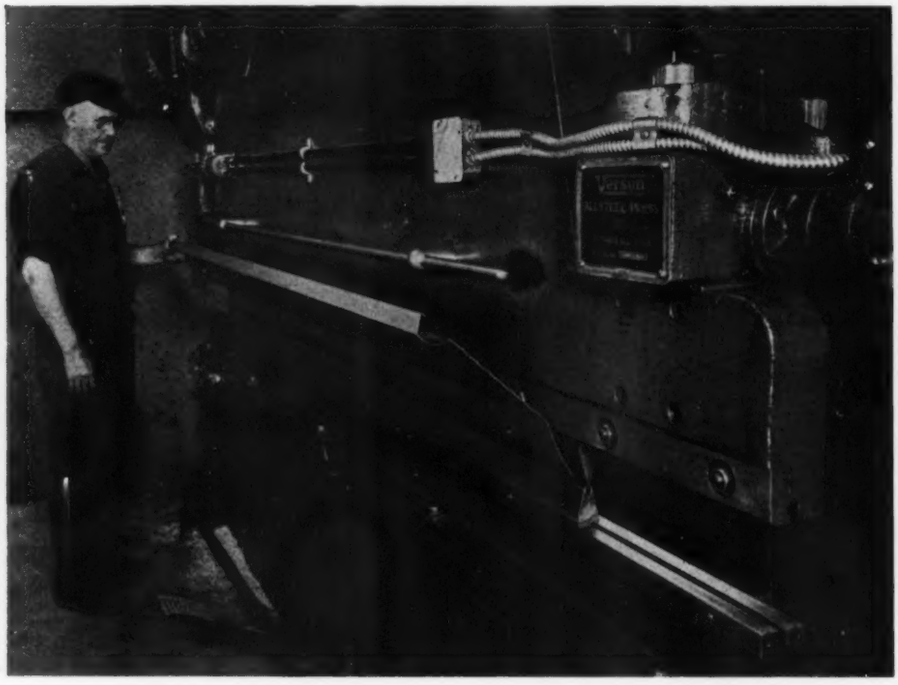


FIG. 5—Side and end panels of the caskets, formerly produced in several brake-operations, are now formed, except for one flange, in this brake in a single press operation.

FIG. 6—These steel caskets were partially crushed the same distance. The soldered joints in the casket at left opened up and total height was decreased. In the welded joint casket, right, no joints broke and greater springback resulted in less deformation.

is arc welded to an end section and this assembly is spot welded to the mating half of the top panel. The three remaining sections of the OG upper half are each hinged to the body section so as to open outward.

The remaining assembly operations on metal parts of the casket are minor and conventional. They involve applying hinges and catches and after finishing, the application of hardware that is purchased.

The use of welding and the elimination of the miter joints in the top panel strengthen the assembly, as compared with soldered joints employed in many caskets. Installation of the hydraulic press made it possible to conduct crushing tests such as shown in fig. 7.

In making these tests, the actual pressure applied in crushing the shells was not sufficient to register on the tonnage indicator. The test involved taking two shells and compressing them from an initial height of 23½ in. to a height of 12 in. Both shells were thus compressed the same distance.

In the case of the shell having soldered joints, left in fig. 7, the shell remained greatly deformed and all soldered joints opened. In the case of the welded shell, right in fig. 7, all joints held intact and there was approximately a 4-in. springback after the pressure was released. This accounts for the welded shell looking as though it was not compressed as much as the other shell.

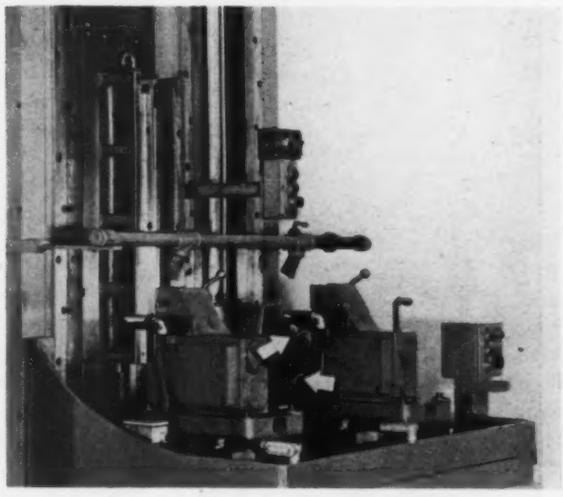
Thus, through the use of the hydraulic press and welded joints, the quality of caskets has been improved and manufacturing economy has been increased. These results are gratifying and fully justify the added investment in manufacturing facilities.

# Broaching Connecting Rods

Automotive caps and rods made from separate forgings will match in final assembly by the broaching setup shown in the accompanying illustration. Both side faces of both the rod and cap are straddle broached simultaneously on a 10-ton, 54-in. stroke, dual ram surface broaching machine manufactured and tooled by the Colonial Broach Co., Detroit.

One cap and one rod are inserted in the same fixture, one above the other (see arrows), locating from the bolt bosses to center them correctly. They are then cut during the same stroke with the same broaches. The surfaces thus produced serve for accurate locating for subsequent machining operations.

Both stations on this dual ram perform the same work, the fixtures being mounted on receding platens to permit loading during the return stroke of the broach. Then, two complete rod assemblies are broached for every machine cycle.



Caps and connecting rods forged separately are straddle broached simultaneously in this setup. They are loaded one above the other as indicated. The dual ram arrangement permits broaching to two sets on each ram stroke.

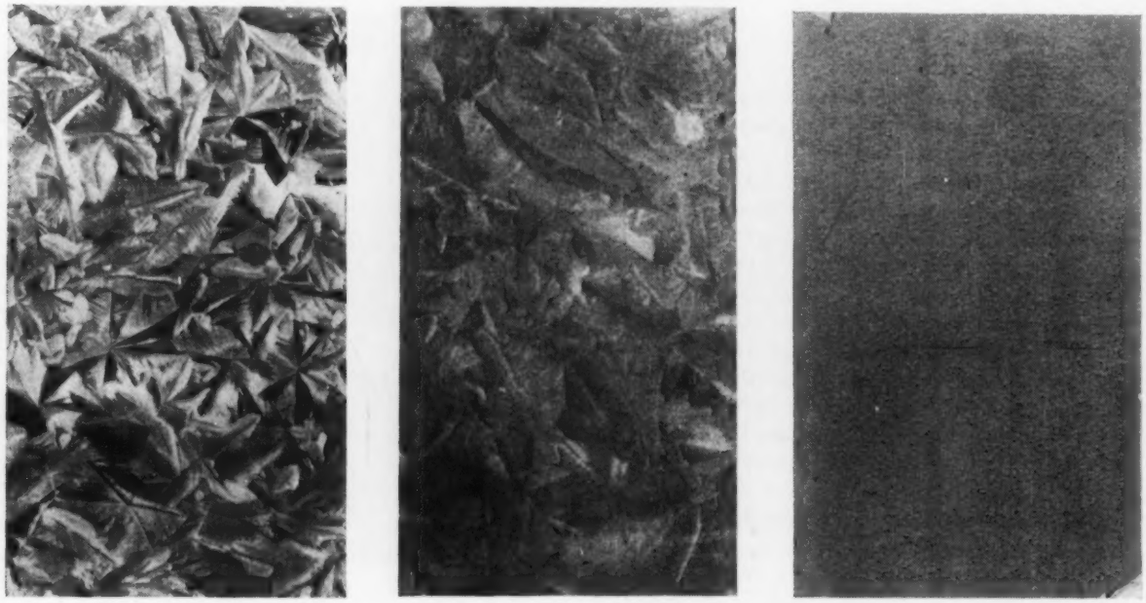
# Continuous Galvanizing

**SUMMARY: Production line galvanizing of heavy gage sheets in coils weighing up to 50,000 lb, such as has been installed at the Irvin Works, was made possible only after an intensive research program. Results obtained in the preliminary investigation are discussed and various fundamental factors, including coating adherences and base metal properties, as related to conventional and continuous galvanizing, are appraised.**

CULMINATING several years of intensive research, conducted jointly by the research and technology department of the Carnegie-Illinois Steel Corp. under the direction of E. C. Bain, and the research department of the American Steel & Wire Co., under the direction of W. O. Everling, a production line for the continuous galvanizing of heavy gage sheets in coils was installed, last year, at the Carnegie-Illinois Irvin Works. As predicted from data obtained in the experimental program, the new unit has made possible the simultaneous achievement of improved quality and increased production, and its success in these respects established it as the prototype for several similar production units now in various subsidiary companies of the U. S. Steel Corp.

The galvanizing line at Irvin Works is equipped to handle coils weighing up to 50,000 lb directly from the rolling mills, and to produce either regular galvanized sheets for the usual trade applications, bonderized sheets for superior paint adherence, or galvannealed sheets for special industrial requirements (see fig. 1). In addition to these products, an extra smooth finished sheet, cold rolled after galvanizing, may also be produced.

The fundamental design of the present commercial unit at Irvin is based on experimental



A B C

FIG. 1—Three finishes produced on continuous galvanized sheets; (A) regular, (B) bonderized and (C) galvannealed. Natural size.

# -a development program

By A. H. WARD

Research Associate,
Galvanizing, Research and Technology Dept.,
Carnegie-Illinois Steel Corp.,
Pittsburgh

work conducted on a pilot coating line located at American Steel & Wire Co. in Cleveland. Detailed practices for coating different grades and gages of steel strip were determined on a supplemental pilot line at Carnegie-Illinois Steel Corp. in Pittsburgh.

The following essential features of the galvanizing problem were recognized at the inauguration of the research program:

(1) The basic requirements for a commercial galvanized sheet are: (A) A coating of sufficient thickness and suitable composition to protect the finished article against corrosion for an extended period of time; (B) an appearance or finish of such a character that formed articles will possess "eye appeal"; (C) coating adherence to withstand the drawing and bending operations involved in fabricating; and (D) mechanical properties in the base metal suitable for drawing and forming operations.

(2) Processing operations necessary in the conversion of coils from modern tandem mills to finished galvanized sheets are annealing, coating, shearing and leveling. Unfortunately, manufacturing methods involving such a number of operations often become complicated by the occurrence of unwanted reactions for which compensation must be made in subsequent processing. In conventional galvanizing, for example, the severe pickling used to enhance coating adherence may cause hydrogen embrittlement, in which case a prolonged boiling treatment is necessary for its elimination. Accordingly, in the preliminary studies leading to the development of the continuous process, special emphasis was placed on the desirability of incorporating only such operations as would fulfill their respective functions without introducing conditions requiring correction.

Factors favoring development of good adherence properties in conventional galvanized coatings have, with but few exceptions, been related to steel composition or to mill treatment prior to coating. For example, steels containing 0.10 to 0.20 pct Si or 0.020 to 0.100 pct P have long been known to be more suitable for the application of adherent galvanized coatings than steels in which the concentrations of these elements are lower. Open annealing has been found to result in more favorable surface conditions than box annealing or normalizing. Also, a rather deeply etched base metal surface produced by severe pickling has usually been found necessary for good coating adherence.

Unfortunately, the means hitherto employed for improving coating adherence in conventional galvanizing do not favor the development of optimum mechanical properties in the base metal. Addition of silicon or phosphorus to the steel base causes a decrease in ductility. Conditions surrounding open annealing produce a harder sheet (with higher yield strength) than does box annealing, and, as previously mentioned, severe pickling may cause hydrogen embrittlement. Fortunately, by manipulation of mill practices and careful regulation of base metal composition, it has been possible to effect, through compromise, a combination of coating adherence and base metal mechanical properties that is well suited to a wide range of industrial applications.

The microstructure of adherent conventional coatings, as determined in metallographic studies conducted during the research project, does not appear to differ consistently from that of non-adherent coatings. For example, the section of an extremely adherent coating on a heavy gage rimmed steel sheet, shown in fig.

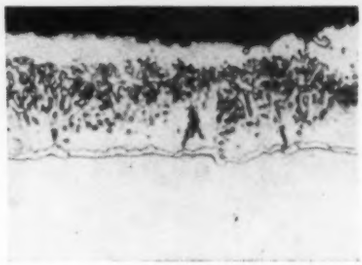


FIG. 2 — Section through coating with good adherence. Base metal open annealed before galvanizing. 500X.

FIG. 3 — Section through coating with poor adherence. Base metal box annealed before galvanizing. 500X.

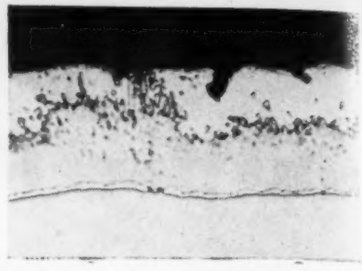


FIG. 4 — Section through coating with good adherence. Base metal surface ground before galvanizing. 500X.

## Continuous Galvanizing

*Continued*

2 may be compared with that of a coating with poor adherence shown in fig. 3. The difference in coating adherence was, in this instance, occasioned by a difference in annealing practice; the former sheet having been open-annealed and the latter sheet box annealed prior to galvanizing.

Mechanical removal of a substantial thickness of base metal by surface grinding before galvanizing appears to improve coating adherence. Fig. 4 shows the structure of a very adherent coating applied to a sheet so prepared. Note that the microstructure does not differ materially from that of either of the above sections. Indeed, the microstructure of coatings of undeformed coated sheets of higher silicon or phosphorus content does not show any characteristic features that could be used to differentiate adherent from non-adherent coatings metallographically. The structure of the coating on a bessemer sheet, fig. 5, which contained about 0.100 pct P, is quite similar to that of both the adherent and the non-adherent coatings in figs. 2, 3 and 4. Although the structure of the coating on the silicon-killed sheet shown in fig. 6 appears to differ somewhat from that of the coating on the bessemer sheet, both coatings were of comparable adherence.

When galvanized coatings flake from the base metal because of poor adherence, the plane of separation is between the alloy layer and the base metal itself, as is shown in fig. 7.

The usual metallic components of a conventional galvanizing bath, whether present as residual impurities (e.g., lead or cadmium) or whether added to effect some modification of bath fluidity or surface finish (e.g., tin or antimony), have very little direct influence upon adherence properties. Aluminum, however, enhances coating adherence under suitable conditions, and its usefulness in this regard has been recognized almost since the beginning of the galvanizing industry. In European hand-dip galvanizing, the practice of adding 0.15 to 0.25 pct Al to the coating bath has long been followed. Mechanization of this practice, which involves a fluxing and drying procedure prior to coating, was the objective of investigations conducted in 1911 at the research laboratory of the former American Sheet and Tin Plate Co. (now a part of the Carnegie-Illinois Steel Corp.).

Effectiveness of aluminum in improving coating adherence lies in its ability to inhibit the alloying of iron and zinc during the coating operation. The extent of this alloying is dependent upon temperature of coating bath, period of time that base metal is immersed in the bath and concentration of aluminum in the bath. Fig. 8 shows total iron alloyed with zinc in the coating of sheet specimens that were prefluxed and hand-dipped in zinc baths of varying aluminum content. The immersion time used throughout was 10 sec and the bath temperature 830° F. Note that with an aluminum content of 0.20 pct in the bath, the iron content of the coating is extremely low. Between 0.20 and 0.15 pct Al, the iron in the coating increases rather gradually. Below 0.15 pct Al the iron content rises rapidly with decreasing aluminum, the most rapid rate of rise occurring between 0.15 and 0.10 pct Al in the bath.

Five photomicrographs, fig. 9, arranged in

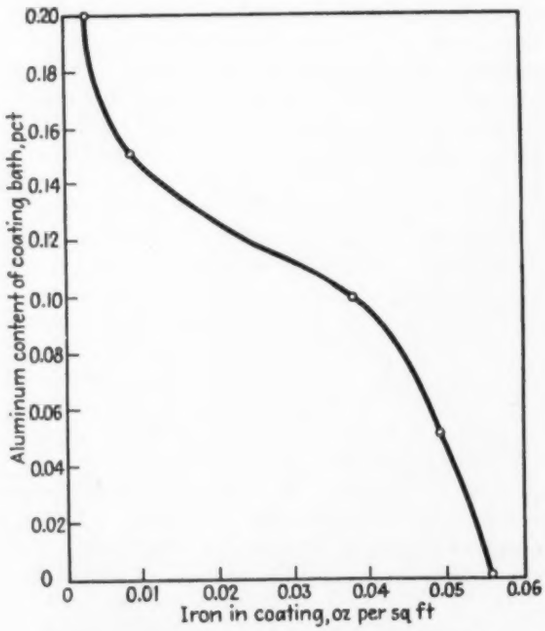



FIG. 8—Influence of aluminum in coating bath in inhibiting alloying of iron and zinc during formation of coating. Bath temperature 830° F; immersion time 10 sec.

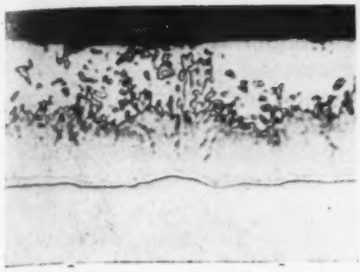


FIG. 5 — Section through galvanized coating on bessemer sheet; adherence good. 500X.

FIG. 6 — Section through galvanized coating on silicon-killed sheet; adherence good. 500X.

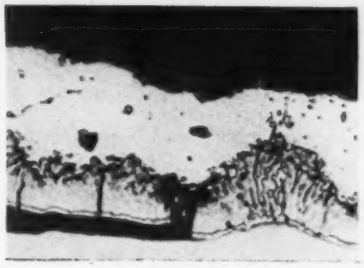


FIG. 7—Galvanized coating with poor adherence, showing separation of coating and base metal under mechanical deformation. 500X.

*In all figures on these pages, bottom layer is base metal; top layer is zinc, and intermediate layer is zinc-iron alloy.—Ed.*

order of decreasing aluminum content, show the actual increase in thickness of the alloy layer as the aluminum content of the bath becomes lower, and suggest that the iron in the coating is a suitable measure of alloy layer thickness. Fig. 10 indicates the general relationship between bath temperature, immersion time and aluminum concentration for a constant weight of 0.01 oz of iron per sq ft in the alloy layer. Coatings produced with an iron content lower than this amount possessed good adherence.

The influence of aluminum in the galvanizing bath upon the adherence of coatings determined in the 1911 research work is shown in fig. 11. In this early work, the relative tightness of coating (adherence) on individual sheets or lots galvanized on an experimental production line was evaluated and given a rating number. The ratings are indicated along the ordinate of the chart, and the percentages of aluminum in the coating bath are shown along the abscissa. Note that with increasing bath temperature and attendant alloying tendency, a higher aluminum concentration was found to be necessary to obtain good coating adherence.

In concluding the research and development work leading to the design of the present production unit, the following features of the coating adherence problem were considered as fundamental in the development of a successful processing method:

(1) Adherence is progressively opposed by increasing thickness of alloy layer.

(2) Certain treatments that affect the surface of the metal to be coated can materially improve the coating adherence, even without the inhibiting effect of aluminum. In this regard, the surface condition of the base metal that favors the development of good coating adherence may be established by conducting the annealing operation in a suitable manner.

(3) Since the optimum sheet temperature in galvanizing lies below the proper annealing temperature, the steel base need not be cooled to ordinary temperature between annealing and galvanizing; advantage should be taken of this circumstance in an effective process.

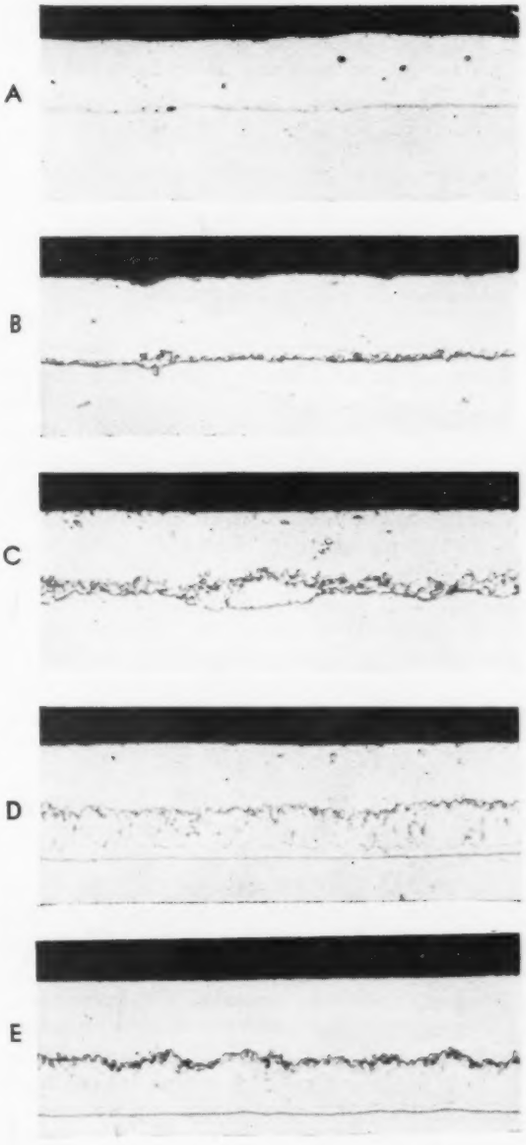



FIG. 9—Sections through galvanized coatings showing influence of aluminum in coating bath upon thickness of zinc-iron alloy layer. Aluminum content of bath: (A) 0.20, (B) 0.15, (C) 0.10, (D) 0.05, (E) none. 500X.

Practically the entire tonnage of steel sheets from modern continuous mills used for conventional galvanizing is manufactured by cold-

reduction methods. The production of galvanized sheets of this type involves the following sequence of operations: box annealing, temper rolling, shearing, pickling, and coating.

The heating to which a temper-rolled sheet is subjected during its passage through the coating pot causes it to undergo strain aging. As a consequence, the finished galvanized sheet is less ductile and is generally harder than the original base metal at the point of entry into the pot. Average mechanical properties before and after galvanizing are listed in table I.

TABLE I

Properties of Sheet Steel Before and After Galvanizing.

| | Yield Point, Psi | Ultimate Strength, Psi | Elongation, in 2 in., Pct | Hardness, Rb |
|---|---|---|---|---|
| Before galvanizing | 29,000 | 49,000 | 38.0 | 45 |
| After galvanizing | 33,700 | 48,500 | 26.0 | 47 |

In annealing cold-worked material, softening and recrystallization of the strained metal takes place at a lower temperature than that necessary for the annealing of material that has been hot worked and finished at a high temperature Softening accomplished in an annealing operation is dependent upon annealing temperature and upon the time interval during which the material is at annealing temperature; and different steels are softened to different extents by a given treatment. Severely cold-worked sheets may soften by annealing at a temperature as low as 1000°F if allowed to remain at temperature for a few hundred hours. Temperatures around 1200°F have been found to be more desirable for industrial use, however, and the slow cooling obtained in box annealing aids in contributing softness to the finished product by prolonging the time in the annealing range.

Consideration of an annealing cycle suitable for continuous operation entailed the determination of optimum strip heating temperatures for various short-heating periods. The response of an 18-gage cold-reduced rimmed steel sheet to rapid annealing in a lead bath is shown in fig. 12. In a holding time of 5 sec at temperature, substantially full softening was not attained at annealing temperatures under about 1280°F, but with a holding time of 20 sec full softening was obtained at an annealing temperature around 1225°F. With the longer holding time, the ultimate softening was greater than that obtained with the shorter holding time.

Studies directed toward the determination of optimum temperatures for short-time annealing on the pilot line indicated that properties obtained by annealing at temperatures around 1300°F (that is, about 100° to 150°F above the softening temperatures) were at least equal to or superior to those obtained by annealing at still higher temperatures.

The marked tendency for hardness increase with corresponding loss of ductility, in annealing within the range of 1350° to 1600°F, may be noted. This tendency was present to some extent in practically all of the tests. In a few tests, principally those involving extremely light gage material, the physical properties were, for all practical considerations, identical for all annealing temperatures used. The tendency for hardness increase, upon heating to temperatures above the lower critical and cooling at the comparatively rapid rates involved, has been attributed to a hardening effect comparable to that obtained in quenching in conventional heat treating operations. The utilization of high temperatures for continuous annealing, if required for special reasons (such as to minimize differences in directional properties) involves the consideration of this hardenability effect and the use of such time-temperature annealing cycles as may be necessary to prevent transformation of austenite to the harder microstructures.

In the pilot line studies, it was found that in the regular rimmed grades the tensile strength

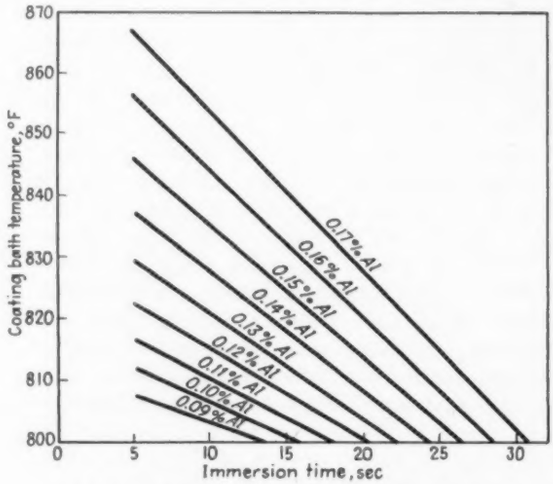



FIG. 10—Coating bath temperature, immersion time and aluminum concentration.

and yield point values obtainable by continuous annealing are, in general, slightly higher than those obtained in box annealing. At the same time the ductility was found to be superior to that of the cold-reduced, box-annealed, temper-rolled and galvanized product or to that of the old conventional galvanized hand mill sheets.

In coating a base material by a dipping method, it is necessary that the surface of the base be capable of being wetted by the coating material. In conventional galvanizing, the pickling operation—a muriatic acid wash—and a molten chloride flux assist in establishing and maintaining the necessary surface conditions. In the continuous method, these essential conditions may be maintained by surrounding

the steel base with an atmosphere that prevents oxidation.

That annealing furnace atmospheres could materially influence the adherence of coatings was recognized at an early stage in the investigations. It was found that with satisfactory annealing temperatures and suitable heat-

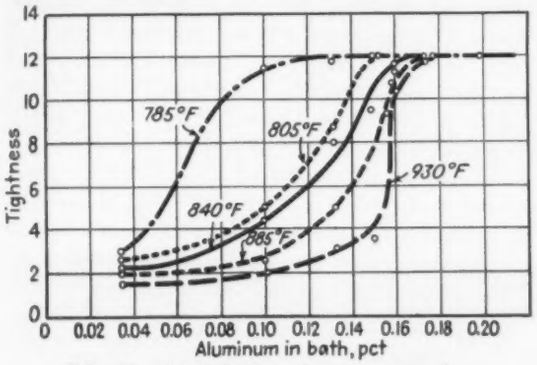



FIG. 11—Original chart from reports of research work conducted by A.S & T.P. Co. in 1911 showing influence of aluminum in coating bath upon adherence of galvanized coating. Tightness is based on assumption that maximum possible tightness is 12.

ing periods, certain gaseous reagents could be made to function very effectively in this regard, even under coating conditions in which a heavy intermetallic layer is formed. The growth of the alloy layer, from the iron of the base metal and the zinc of the coating bath, causes the plane between the base metal and the coating to progress inwardly from the original surface. This plane is also a potential plane of cleavage when a coated object is mechanically deformed, as is shown in fig. 7. Use of a coating bath, in which the alloying action can be retarded,

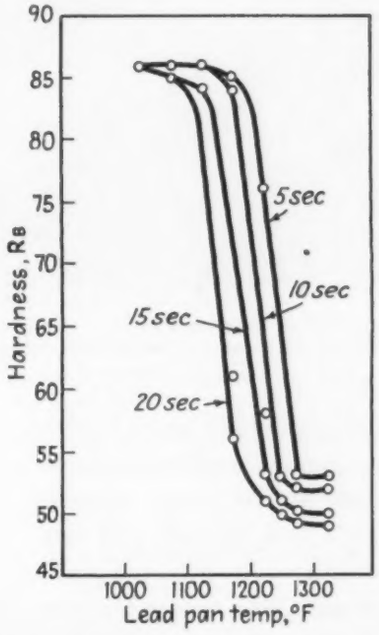



FIG. 12—Influence of annealing temperature and holding time upon hardness of cold reduced strip annealed in lead pan.

minimizes the depth of the potential cleavage plane.

By utilizing a properly prepared high hydrogen atmosphere in the furnace and a precautionary means to guard against its contamination, it has been found possible to use the annealing temperature necessary for optimum physical properties and yet maintain conditions suitable for the development of excellent adherence. It has been found practicable to conduct the hot-dipping step during the course of the cooling operation and thus to eliminate the necessity for reheating.

Coatings produced by the continuous method possess a rather highly reflective, well spangled finish. Spangles are generally somewhat

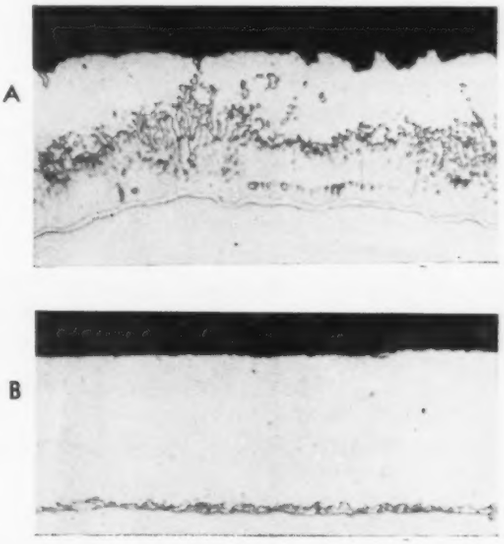



FIG. 13—Sections of conventional (A) and continuous galvanized (B) coatings showing relative thicknesses of alloy layers. 500X.

FIG. 14—Section of conventional galvanized coating with impressions made by indenter in Tukon Hardness Test. 500X.

smaller than those of the conventional sheet. Another distinctive feature of the new coating is the comparative thinness of the zinc-iron alloy layer, as indicated in fig. 13. The intermetallic alloy constitutes a substantial portion of the conventional coating but only a minor portion of the new coating. The extreme hardness of the zinc-iron alloy as compared with that

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# Precision Hardening High-Speed Tool Steels

By Norbert K. Koebel
Director of Research,
Lindberg Engineering Co.,
Chicago

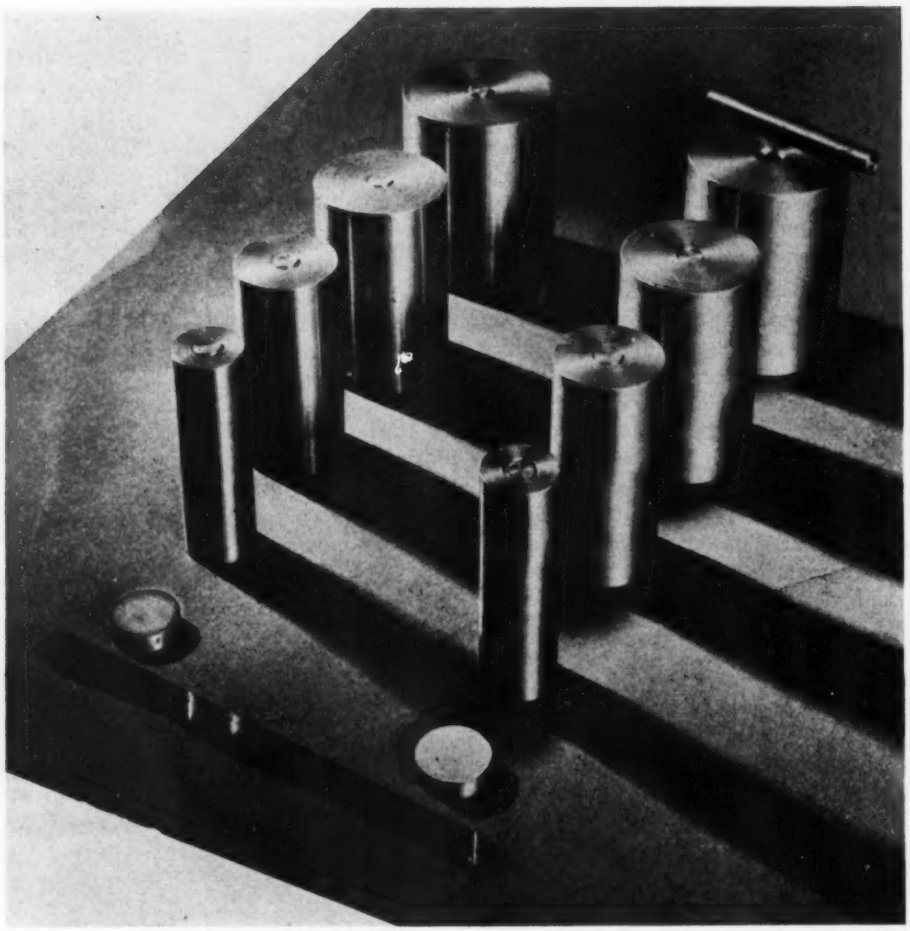


FIG. 6—Test bars of various diameters (3 in. long) with ⅜ in. diam inserts used to determine the effectiveness of the atmosphere quench. Small test pieces in foreground were used for change-in-weight tests.

**SUMMARY: Protective atmosphere hardening of high-speed tools in the L-furnace is said to yield economical, processing and metallurgical advantages over conventional heat treating methods. Metallurgical results, obtained from the quenching phase, are compared with air, oil, salt and lead quench techniques, in this concluding part of a two-part article. Associated physical property data are also presented. The L-furnace was described in part I (Oct. 6, 1949).**

PROTECTIVE atmosphere quenching, especially in heavy sections, is revolutionary to the general practice and metallurgical concepts of quenching high-speed tool steels.

Naturally, the question arises: How does the protective atmosphere quench compare with oil, salt, or lead quenches? To answer this question, considerable research work was conducted to compare the results of protective atmosphere quenching with oil quenching. The history of many atmosphere-quenched, high-speed tools was compared with the life history of similar tools heat treated and quenched by conventional high-speed steel methods, since practicability of the protective atmosphere quench is based upon results obtained from tools heat treated in this manner from three installations operating in industry over a year rather than from conclusions drawn from laboratory tests.

Metallurgical concepts of quenching high-speed tool steels by air cooling have been discussed by Bancraft and Wight.[1] These authors conclude that air cooling of anything but very thin sections, which will cool rapidly, will permit some precipitation of carbides at temperatures above about 1300°F. This depletion of carbides from solid solution results in (1) lower secondary hardness after the high draws, (2) lower wear resistance, and (3) lower hot hardness. Bancraft and Wight, therefore, conclude that it is not desirable in practice, to air cool anything but fairly thin sections.

The protective atmosphere quench of the L-furnace should not be thought of in terms of an air quench. This furnace was designed to provide a quenching rate between the comparatively rapid oil, salt, or lead quenches, and the slow air quench, in order to eliminate tool cracking, increase tool toughness and reduce distortion and dimensional changes, coupled with dry atmosphere quenching to produce practical, bright results, eliminating washing, cleaning, sandblasting, grinding and other costly finishing operations. The L-furnace atmosphere quench obtains the speed of the quench as follows:

(1) Circulating cold protective atmosphere (60° to 70°F) over the tools by forced convection (the high hydrogen content of the endothermic (Hyen) atmosphere has about four times the thermal conductivity as compared to air).

(2) Rapid conduction due to the tray of tools resting directly on the water-cooled hearth of the quench chamber.

(3) Radiation from the water-cooled sides and top of the quench chamber.

(4) A more rapid heat transfer because the surface remains bright and there is no insulating effect from scale, which retards heat transfer as in the case of air quenching.

In order to obtain metallurgical data on quenching speed, a series of test bars, 3 in. long and ranging in diameter from 1 to 2½ in., as shown in fig. 6, were made up from all types of high-speed tool steels. Analyses of the different types of steels used are given in table I.

In order to eliminate the difficulty of cutting the hardened bars and the error from overheating and burning in the cutting process, and also to eliminate errors due to core defects, segregations, etc. and their effects of core hardness readings and microstructure when compared to the surface, a hole, ⅜ in. diam was drilled through each test bar. A ⅜-in. diam insert (machined from ½-in. diam stock of the same type of steel) was then located in the center of each test bar with a light, hand-press-fit. After each test, the center core reading was easily taken by pressing out the insert, cutting the bar in two, and comparing the reading on the surface end with the center core end.

To compare surface structure with core structure, test specimens were then cut longitudinally from the ⅜-in. bar. In all cases the surface readings of the large diameter bar were taken on various points of the bar without grinding or cleaning and were compared with the surface end reading of the ⅜-in. insert. These surface readings were found to be the same in all cases, eliminating any error occurring from the possible difference in hardenability of the steel in the ⅜-in. insert and the steel of the large diameter bar.

**Results of Hardness Tests**

Results of the hardness tests are summarized in table II. It is interesting to note that surface hardness of the 18-4-1 atmosphere quenched bars is the same as the oil-quenched bars in the as-quenched condition and also after the double draw treatment. Core hardness readings of the atmosphere-quenched bars were always found to be lower than the oil-quenched bars. This was more noticeable on the 18-4-2 type of steel than on any other type of high-speed steel.

It should be particularly noted that although lower core hardness readings were obtained with the protective atmosphere quench, the as-quenched hardness readings did not drop after the double draw, but increased in a majority of cases. This indicates that the protective atmosphere quench was fast enough to prevent excessive precipitation of carbides from solid solution, which would result in lower secondary hardness after high draws, as in the case of relatively slow air quenching.

Microstructure studies of the core and surface of atmosphere-quenched compared with oil-quenched samples, further verifies this statement. Fig. 7 shows the core structure obtained with an atmosphere quench, compared with the core structure of an oil-quenched specimen from the 2½-in. diam test bar. The carbides are actually larger in the case of the oil-quenched specimen, which is the reverse of what was expected. This difference can easily be due, however, to the difference in the sample bar structure before hardening.

In both cases the microstructures are considered good from the point of view of grain size, and carbide distribution and size. There is no excessive precipitation of carbides at the grain boundaries. The surface structures of both atmosphere-quenched and oil-quenched specimens are comparable, with the exception that carbide size of the oil-quenched specimen is larger than the atmosphere quenched specimen. This seems to be inherent in the steel. Both samples were given identical heat treatments except for the quench. The microstructure of the surface of the oil-quenched specimen also compares directly with the core structure of the same sample. This is also the case of the atmosphere-quenched specimens. The difference in the surface and core hardness of the atmosphere-quenched samples could not be accounted for in the microstructure.

These results may raise a question as to whether lower core hardness readings are detrimental or beneficial in the practical heat treatment of high-speed cutting tools. Reports on tools heat treated in L-furnace installations in industry indicate that tools are much tougher when atmosphere-quenched than with the oil or salt quench methods. This can be expected from a slightly lower core hardness and also from the fact that the tools have less residual stresses (which are due to non-uniform rates of transformation throughout the mass, caused by faster quench methods).

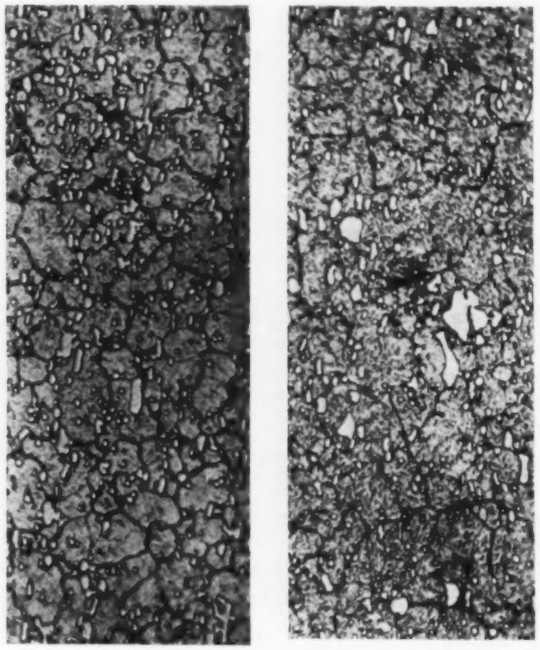



FIG. 7—Center core structure of a 2½-in. diam 18-4-1 high-speed steel test bar, (A) atmosphere quenched, and (B) oil quenched. Hardness of (A) is 61 Rc and hardness of (B) is 65.5 Rc. Etched in 2 pct nital for 40 sec. 500X.

In oil quenching, the stresses produced are so great that one can always count on a section over 1½ in. cracking at a sharp corner. Such a tool failure is shown in fig. 8. Salt and lead quenches minimize this tendency, but will not by any means eliminate it completely.

Results from L-furnaces, based on field tests, have shown that no tools have been cracked in hardening, quenching, or tempering. These results also indicate that dimensional changes in hardening were greatly reduced. This was particularly noted in running test sample bars (see fig. 6) to obtain quenching data. The ⅜-in. inserts of the oil-quenched bars had to be pressed out with a 10-ton press in the sizes over 1 in. diam, while the ⅜-in. inserts of the atmosphere-quenched bars could be pressed out with finger pressure. There was also a change in the dimensions of the oil-quenched bars, but the atmosphere-quenched bars remained the same.

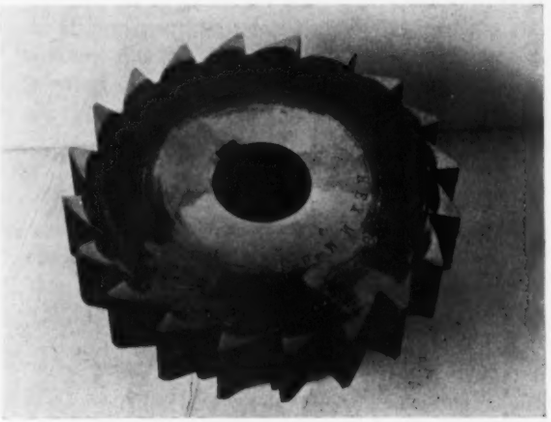


FIG. 8—A typical cracked high-speed tool steel part. This frequently occurs when oil quenching heavy sections with sharp inside corners.

In summarizing, all indications point to beneficial rather than detrimental effects from the slightly lower core hardness obtained by protective atmosphere quenching. Time may prove, however, that there may be specific instances where the reverse is true.

The protective atmosphere used in all tests was the endothermic type. The exact analysis of the atmosphere from the generator and from the furnace high heat chamber is shown in table III, and the effectiveness of the L-furnace in keeping the atmosphere under control can be seen by comparing the two analyses. The gas sample from the furnace was taken 1 min after the charging door had been closed, after previously having been opened for 1 min.

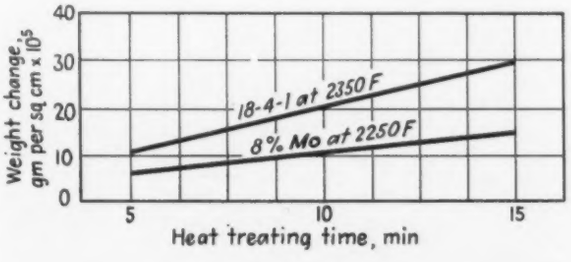
Fig. 9 summarizes results of the change-in-weight method showing the effectiveness of the furnace atmosphere from preventing decarburization or excessive carburization. The change-in-weight method is a very sensitive means for detecting decarburization or carburization: A

complete discussion and instructions on making the test have been previously covered by the author.[5] Slowter and Gonser[3] list —0.00020 to +0.00050 gm per sq cm as acceptable limits; however, a change in —0.00020 gm per sq cm cannot be detected by the microscope or by hardness tests.

It should be borne in mind, when interpreting the results of fig. 9 to a practicable basis, that the samples used were only ⅞ in diam by ¼ in. long required only a 2-min total time in the high heat zone for proper hardening. Prolonged soaking at the high heat temperature shows the reliability of the atmosphere. The amount of carburization indicated in fig. 9 for the 15-min sample would not occur on a large cross-sectional tool requiring such a time because the tool would not be up to temperature for the 15-min period. This is shown in table II in the heat treatments of the various diameter test bars. The time required for the 2½-in. diam bar to reach 2350°F, after being preheated up to 1700°F, was only 7 min plus a 2-min soak; therefore, the 15-min sample change-in-weight indicates what would happen if high-speed steel were permitted to soak that long at the hardening temperature.

Surface hardness readings of all change-in-weight samples indicate full hardness. Fig. 10 shows the structure at the edge of the 5-min sample of 18-4-1 steel. There is no indication of carburization or decarburization. The results and benefits of such precision hardening have been reflected from tools heat treated in the L-furnaces, and users report from two to five times the tool life on tools that could not be ground after hardening as compared with other conventional hardening processes.

After the steel has been hardened bright, there still remains the problem of keeping the steel bright during the tempering operation. High-speed tool steels are tempered from 1000° to 1100°F, which is within the scaling temperature of the steel if tempered in air. Although the scale is very light, some means must be provided to eliminate it on tools that cannot be ground or polished and must remain clean and bright throughout the entire hardening and tempering process. This problem has been solved by providing retorts to fit into any of the standard Cyclone air tempering furnaces. The same protective atmosphere used for hardening is also used in the retort for bright tempering.




| Type | Hardness, Rc | | | | | |
|---|---|---|---|---|---|---|
| | As quenched | | | Double draw; 2 hr | | |
| | 5 min | 10 min | 15 min | 5 min | 10 min | 15 min |
| 18-4-1 | 66.0 | 65.0 | 65.0 | 66.0 | 67.0 | 67.0 |
| 8% Mo | 64.5 | 64.0 | 64.5 | 64.5 | 65.0 | 65.5 |

FIG. 9—Change-in-weight test shows effectiveness of the L-furnace in controlling carburization and decarburization of 18-4-1 and 8 pct Mo high-speed tool steels in endothermic atmosphere. Test specimens are ⅞ in. in diam by ¼ in. long. Surface hardness is indicated for each test specimen.

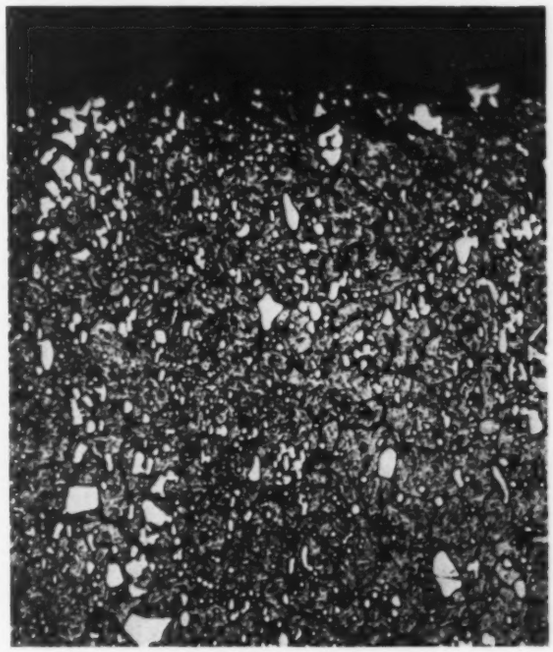


FIG. 10—Structure at top edge of the 5 min test specimen of 18-4-1 steel referred to in fig. 9. No carburization or decarburization detectable. Note normal size of carbides up to very edge of steel. Etched in 2 pct nital for 1 min; surface hardness 66 Rc. 500X.

Fig. 11 shows a standard toolroom box Cyclone with a retort being inserted into the furnace. When tools are to be bright tempered, they are loaded into the retort and the retort cover is bolted closed. The protective atmosphere is then introduced, and after the retort has been purged of all traces of air, the furnace door is swung aside and the retort is inserted. At the end of the tempering cycle, the retort is removed from the furnace, but the protective atmosphere is allowed to flow until the tools are below 350°F. When production is heavy, two retorts are used for each furnace; one retort is heated while the other is cooling.

Fig. 12 shows a retort being lowered into a standard pit type Cyclone furnace. When a large retort is used for heavy production, a recirculating fan is built into the retort to recirculate the protective atmosphere through the charge of work to provide uniformity and fast heating and cooling. Thermocouples are always provided in the retort to give the true temperature of the

**TABLE I** Analyses of High-Speed Steel Test Bars Used in Obtaining Quenching Speed Data

| Constituents | Types of High-Speed Steel | | | |
|---|---|---|---|---|
| | 18-4-1 | 18-4-2 | 18-4-1+Co. | Mo |
| C, Pct | 0.70 | 0.65 | 0.71 | 0.83 |
| Si, Pct | 0.30 | 0.35 | 0.32 | 0.30 |
| Mn, Pct | 0.20 | 0.25 | 0.20 | 0.25 |
| W, Pct | 18.00 | 18.00 | 18.25 | 6.35 |
| Cr, Pct | 4.00 | 4.0 | 4.25 | 4.20 |
| V, Pct | 1.00 | 2.0 | 1.08 | 1.90 |
| Co, Pct | .... | .... | 4.75 | .... |
| Mo, Pct | .... | .... | 0.65 | 5.0 |

**TABLE III** Composition of Atmosphere Used in all Tests and Effectiveness of Furnace Design to Keep Atmosphere Under Control. Sample Taken from Furnace 1 Min After Closing Charging Door

| Constituents | Endothermic (Hyen) Atmosphere Used In Tests | |
|---|---|---|
| | From Generator, Pct by Volume, Dry Basis | From Furnace, Pct by Volume, Dry Basis |
| $CO_2$ | 0.0 | 0.0 |
| $O_2$ | 0.0 | 0.0 |
| CO | 20.0 | 20.4 |
| $H_2$ | 40.5 | 41.4 |
| $CH_4$ | 1.2 | 0.6 |
| $N_2$ | balance | balance |
| $H_2O$ | 0.198 (Dew Point 8° F) | 0.216 (Dew Point 8° F) |

**TABLE II** Summary of Test Results Showing Effectiveness of Atmosphere Quench on Various Diameter Test Bars of Different Types of High-Speed Tool Steels

| Test Bar Diam, In. | Type of Steel | Heat Treatment | | | | | Hardness, Rockwell C | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Preheat | | High Heat | | | | | | |
| | | °F | Time, Min | °F | Time, Min | Quench | Reading at | As Quenched | 2½-Hr Draw at 1050° F | 2½-Hr Draw at 1025° F |
| 1 | 18-4-1 | 1400 to 1700 | 25 | 2350 | 4+2 | oil | surface | 65.0 | 66.0 | 66.0 |
| | | | | | | | center | 65.0 | 65.0 | 66.0 |
| | 18-4-1 | 1400 to 1700 | 25 | 2350 | 4+2 | atm. | surface | 65.0 | 66.0 | 66.0 |
| | | | | | | | center | 63.0 | 62.5 | 62.0 |
| | 18-4-2 | 1400 to 1700 | 25 | 2350 | 4+2 | atm. | surface | 65.0 | 65.0 | 65.0 |
| | | | | | | | center | 59.0 | 60.0 | 60.0 |
| | 18-4-1+5% Co | 1400 to 1700 | 25 | 2375 | 4+2 | atm. | surface | 62.0 | 66.5 | 66.5 |
| | | | | | | | center | 56.5 | 61.5 | 62.0 |
| | Mo-5% | 1400 to 1600 | 40 | 2250 | 6+2 | atm. | surface | 64.5 | 65.0 | 65.5 |
| | | | | | | | center | 60.0 | 60.5 | 60.0 |
| 1½ | 18-4-1 | 1400 to 1700 | 35 | 2350 | 5+2 | oil | surface | 65.0 | 67.0 | 66.5 |
| | | | | | | | center | 65.0 | 65.0 | 66.0 |
| | 18-4-1 | 1400 to 1700 | 35 | 2350 | 5+2 | atm. | surface | 66.0 | 66.5 | 66.0 |
| | | | | | | | center | 63.5 | 63.0 | 63.0 |
| | 18-4-2 | 1400 to 1700 | 35 | 2350 | 5+2 | atm. | surface | 65.5 | 66.0 | 66.5 |
| | | | | | | | center | 60.0 | 61.0 | 62.0 |
| | 18-4-1+5% Co | 1400 to 1700 | 35 | 2375 | 5+2 | atm. | surface | 62.0 | 66.0 | 67.0 |
| | | | | | | | center | 57.0 | 62.5 | 63.0 |
| | Mo-5% | 1400 to 1600 | 50 | 2250 | 8+2 | atm. | surface | 64.5 | 65.5 | 65.5 |
| | | | | | | | center | 61.5 | 61.0 | 60.5 |
| 2 | 18-4-1 | 1400 to 1700 | 45 | 2350 | 6+2 | oil | surface | 65.0 | 66.0 | 66.5 |
| | | | | | | | center | 64.5 | 66.0 | 66.0 |
| | 18-4-1 | 1400 to 1700 | 45 | 2350 | 6+2 | atm. | surface | 65.0 | 66.0 | 66.5 |
| | | | | | | | center | 63.5 | 63.5 | 63.0 |
| | 18-4-2 | 1400 to 1700 | 45 | 2350 | 6+2 | atm. | surface | 64.5 | 65.0 | 65.5 |
| | | | | | | | center | 60.0 | 60.0 | 60.0 |
| | 18-4-1+5% Co | 1400 to 1700 | 45 | 2375 | 6+2 | atm. | surface | 64.0 | 67.5 | 66.5 |
| | | | | | | | center | 59.0 | 64.0 | 64.5 |
| | Mo-5% | 1400 to 1600 | 60 | 2250 | 10+2 | atm. | surface | 65.0 | 66.0 | 65.5 |
| | | | | | | | center | 61.5 | 60.0 | 60.5 |
| 2½ | 18-4-1 | 1400 to 1700 | 55 | 2350 | 7+2 | oil | surface | 65.5 | 66.5 | 66.0 |
| | | | | | | | center | 65.0 | 65.0 | 65.5 |
| | 18-4-1 | 1400 to 1700 | 55 | 2350 | 7+2 | atm. | surface | 65.0 | 66.0 | 65.5 |
| | | | | | | | center | 63.0 | 62.0 | 61.0 |
| | 18-4-2 | 1400 to 1700 | 55 | 2350 | 7+2 | atm. | surface | 65.5 | 64.0 | 65.0 |
| | | | | | | | center | 61.0 | 61.0 | 60.0 |
| | 18-4-1+5% Co | 1400 to 1700 | 55 | 2375 | 7+2 | atm. | surface | 64.0 | 66.0 | 66.5 |
| | | | | | | | center | 63.0 | 63.5 | 64.0 |
| | Mo-5% | 1400 to 1700 | 80 | 2250 | 12+2 | atm. | surface | 64.5 | 65.5 | 65.0 |
| | | | | | | | center | 63.0 | 62.5 | 62.0 |

charge. Cooling pits are also provided to cool the heavy charge rapidly. Cold air is blown around the outside of the retorts in the pits to extract the heat. Recirculation of the cold protective atmosphere in the retort reduces the temperature of the work uniformly.

Atmosphere retorts are frequently used for purposes other than bright tempering; for example, nitriding of high-speed steels can be carried out by using anhydrous ammonia as the atmosphere. This atmosphere will also keep the tools bright. Bright tempering and nitriding can simultaneously be carried out on tools where such a treatment is beneficial. In some cases, it is desirable to produce a jet black finish, which can be produced in the same retort by using steam as the atmosphere. Steam imparts a gray, hard, tight, impervious oxide coating which turns jet black when dipped into oil. This type of finish is used for appearance, rust resistance, and better cutting qualities. On some types of tools, the etched oxide coating produced by steam retains the lubricant and provides increased tool life.

Thus, a retort has many uses in a tempering furnace, from producing bright finishes to black finishes to surface hardening. When production warrants it, batch type retorts can be replaced with continuous, straight line, mesh belt conveyer, roller hearth conveyer, or pusher type furnaces.

It can therefore be stated, in summary, that production testing of three installations has proved that this process offers the following advantages:

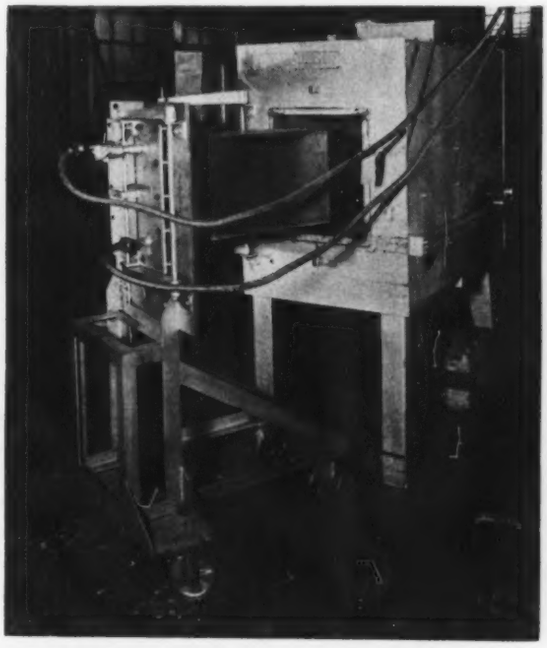


FIG. 11 — Method of adapting retort to a standard Lindberg toolroom box Cyclone furnace to achieve bright tempering.

FIG. 12 — Method of adapting retort to a standard Lindberg production type vertical furnace to achieve bright tempering.

(1) Greater tool life, because cutting edges are free from decarburization.

(2) Complete elimination of tools cracking in the hardening and tempering process.

(3) Bright hardening eliminates the necessity for removing scale by sandblasting or grinding.

(4) Decarburization-free and carburization-free hardening eliminates grinding operation.

(5) Atmosphere quench eliminates drastic dimensional change and, therefore, most tools can be ground to size before hardening.

(6) More pounds of steel treated per kilowatt because heat losses due to radiation and atmosphere are greatly reduced with preheat and high heat combined into one unit.

(7) Eliminates the necessity of washing quench oil from the work.

(8) Eliminates oil quench tank and oil cooling systems.

(9) Combined unit saves floor space.

(10) Uses only one-half the protective atmosphere required by separated preheat and high heat.

(11) More comfortable to operate because operator is not subjected to radiation from high heat furnace.

(12) Combined unit permits additional hardening operations, bright annealing operations and bright brazing operations which cannot be obtained from separate preheat and high heat furnaces.

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[1] *W. A. Bancraft and W. W. Wight, "The Practical Heat Treatment of High-Speed Steel Cutting Tools," Metal Progress, April* 1948, *p.* 548.

[2] *N. K. Koebel, "Methods for Determining the Degree of Carburization or Decarburization and Evaluating Controlled Atmospheres," Controlled Atmospheres, ASM, Cleveland, p.* 128.

[3] *D. K. Bullens, "Steel and Its Heat Treatment," Vol. II, p.* 128, *John Wiley and Sons, New York.*

# MODERN REFRACTORIES

## give new operating economies

By R. P. HEUER
Vice-President
and
M. A. FAY
Ceramic Engineer,
General Refractories Co.,
Philadelphia

**SUMMARY: Following an appraisal of the relative merits of various types of refractories in blast furnace practice in the first part of this article (Oct. 6, 1949), the authors turn to other steelmaking operations in this concluding part. Developments in refractories for openhearth furnaces and mixers, soaking pits and forging furnaces are discussed, and economies relating to the all-basic furnace are presented. Also included is a listing of basic-end openhearth installations in this country and Canada.**

OPENHEARTH furnaces present unusually complex problems in the determination of the most economical use of refractories. Production rate, fuel cost, refractory life, labor costs, extent of hot repairs, etc., all are interrelated and yet can be varied independently in some measure by operating and refractories practices. Because of this, there can be no standardized refractories practice which will be recognized everywhere as most economical.

General trends in refractories practices for openhearth furnaces do exist and can be studied with regard to economy. Certain new procedures which represent wide departures from previous practices also can be compared and evaluated.

The most pronounced general trend is the increasing use of basic brick, replacing silica brick, in basic process furnaces. This trend started about the turn of the century when burned magnesite brick were first used in unexposed positions in hearth constructions of furnaces. The use of steel tubes packed with magnesite and the improvement of burned chrome refractories brought about the first usage of basic materials in exposed positions in the furnace prior to 1920. The development of chemically-bonded magnesite-chrome refractories during the 1920's marked the beginning of a tremendous expansion in the application of basic refractories to front walls, back walls, monkey walls, end-wall panels, bridge walls and burner dog houses. Further improvements in basic refractories, particularly in steel-plated magnesite-chrome brick, have enlarged such usage still further, until at present, employment of these brick in the above mentioned locations is almost universal, and basic brick are replacing silica brick throughout furnace end

structures in many plants and are being tested in main roofs.

Generally speaking, almost every move toward the use of more basic refractories has resulted in economic savings by virtue of increased refractories life and decreased repairs, even though the first cost of basic brick is about four times that of silica. Frequently, the basic brick has not been adopted as a measure of economy, but has been inaugurated to decrease hot repairs, increase furnace life, or some other similar improvement in which cost was not a direct factor. When reliable cost data had been accumulated, however, it was found in most cases that the overall practice was more economical with basic refractories than with silica refractories.

A wide variety of basic refractories are offered for openhearth furnaces. Bricks which range from pure magnesite to straight chrome ore, with various intermediate compositions, are manufactured. Various of the compositions are supplied in the burned or unburned (chemically-bonded) conditions and many chemically-bonded brick are sheathed in steel plates.

Election of brick to be used is predicated on cost and particular advantages of each type of brick. Prices of basic brick vary with composition and type of manufacture; in general, the sales price increases as magnesite content increases. Also, fired bricks sell at higher prices than chemically-bonded bricks of equivalent composition. These facts tend to promote the use of chemically-bonded chrome-magnesite brick.

Best service life is obtained from the use of steel-plated magnesite-chrome refractories in virtually all exposed positions in openhearth furnaces. In frontwall piers, particularly those of the archless type, backwalls, monkey walls, bridge walls, burner dog houses, and throughout the furnace end-structures, steel-plated brick yield exceptional service. It is interesting to note that desired results are best obtained from brick formed with the steel sheath as an integral part. Such brick are plated on four sides and provide metal-to-metal contact with adjacent bricks. This condition not only enhances interreaction between adjacent brick to form almost monolithic and mechanically stable structures but also promotes reaction between the brick material and the oxide product of the plate. This reaction is thought to be essential to the long service life of such brick. Fig. 1 shows a battery of large hydraulic presses used in a modern brick plant to produce such steel-plated magnesite-chrome brick.

Steel-plated magnesite-chrome brick are not used universally in openhearth furnaces because the longest service life obtainable is not always the most economical. If one part of a furnace wears out sufficiently to necessitate repairs and other parts of the furnace are not in adequate condition to endure another similar campaign, all must be rebuilt. Occasionally, under such circumstances, use of less expensive refractories, which under less severe operating conditions of some locations will run the campaign length of the weakest furnace part, is more economic. Chrome-magnesite brick find wide application in openhearth furnaces in such applications. They yield very good service in all locations where steel-plated magnesite chrome brick excel and their use is largely dictated by individual furnace characteristics.

As stated before, straight magnesite and

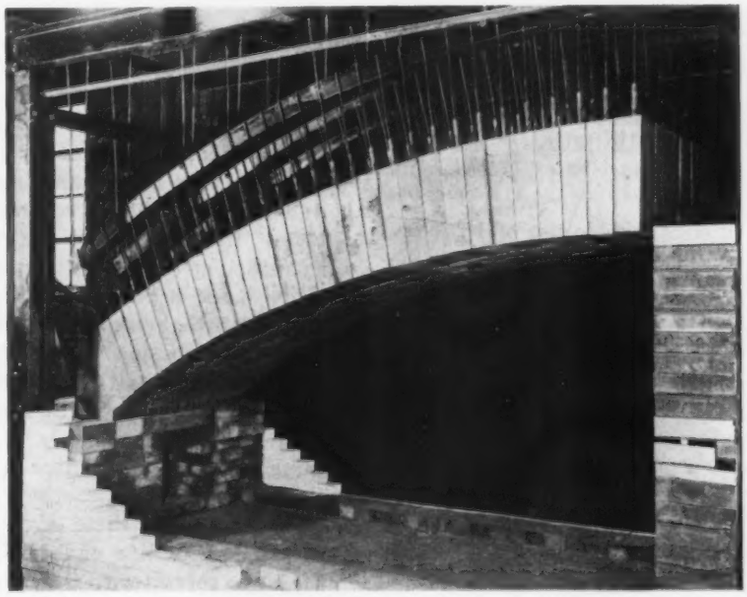


FIG. 2—Interior view of partially-constructed new type basic roof. Steelklad encasement of brick and resilient loading maintain desired pressure on the individual bricks.

straight chrome brick are used largely in unexposed positions, such as the furnace bottom. Both must also compete with chrome-magnesite brick. The choice among these brick is determined by local preference, the magnesite brick having greater chemical resistance, while the chrome brick have greater volume stability and are not subject to hydration during shutdowns. Normally the least expensive of these brick is the most economical, since all yield satisfactory service.

Silica refractories for openhearth furnaces have also been further developed during the last decade. Improvement of the refractoriness of silica brick has been achieved by a more careful selection of raw materials so that impurities, particularly alumina, alkalies and titania, are kept to a minimum. This has brought about sales price increases for the improved brick. The economy of the use of such premium price silica brick is still being studied. Some plants have found the more expensive brick offer no particular benefits and merely increase refractories costs, while others have found them beneficial and advantageous. Most plants using the special silica brick regularly, confine these special brick to relatively small panels in silica main roofs at locations where most severe wear usually occurs.

Improved silica mortar is also being manufactured. This material is chiefly intended for use in openhearth silica roofs and front walls. Use of such silica mortar has been found definitely beneficial and economical in all places in silica roofs and front walls where mortar is required, despite the fact that high purity mortar sells at a considerably increased price over regular silica mortars. With the improved mortar, washing out of mortar joints, with attendant erosion of adjacent brick, is virtually eliminated.

Two new refractories constructions, which represent wide departures from previous techniques, are completely basic ends and the all basic furnace. Both incorporate large amounts of suspended construction which is relatively novel in openhearth furnaces. Because of this they cannot be considered mere substitution of basic refractories for silica, but must be evaluated separately as distinct practices.

Completely basic ends include use of basic refractories throughout the end structures from the port roof at least down to the fantail level and in some cases all the way to the slag pocket floor. Suspension is used for the port roof and all of the wall sections below floor level and above fantail level. Thus, the arch beneath the burner is no longer needed for support of the chill wall, the wall being suspended, and the arch is raised to floor level or above and in some cases where artillery type burners are used, is eliminated completely. Walls are made thinner and are of the simplest masonry construction. Fewer brick are required, a basic end using only about 60 pct as many equivalents of brick as a conventional silica end. However, some additional steel work is required in the furnace superstructure to support and suspend the basic walls.

FIG. 3—New basic brick in openhearth end wall tie plate between every fifth course of brick. Mechanical suspension is located at floor level.

The initial cost of installing completely basic ends on most furnaces is approximately $50,000 over and above the cost of a normal complete rebuild. This cost is justified in decreased refractories material costs, decreased labor costs for tearing down, cleaning out and rebuilding, and the intangible advantage of increased production which results from decreased downtime. Under present conditions about 2 to 3 years are required for the accumulated saving from the use of basic ends to equal the initial cost.

Individual advantages of basic ends are interrelated and difficult to separate. Probably the most important advantages is the decidedly decreased labor costs resulting from the smaller number of manhours required to lay the fewer bricks, the long life of the refractories and the small extent of repairs required. Bricklaying is also speeded because the structure, being simple, requires little brick cutting. In addition, removal of slag from basic ends is much faster and entails less labor because the slag is virtually granular and is readily removed by mechanical equipment. This slag consists largely of iron oxides and is valuable as a blast furnace or openhearth charge material.

Some of these same advantages—fewer brick required, long life and few repairs—also yield the lower refractories material costs of basic ends despite the basic brick costing about four times as much per brick as silica refractories.

The intangible advantage of increased produc-

tion by virtue of decreased downtime amounts to about 5 pct in times of peak production.

The economy of completely basic ends has been proved and demonstrated in many plants. Perhaps the best proof of this is the fact that at least six openhearth plants are converting all of their openhearths to basic ends and almost 40 such furnaces are being operated now. Table 1 shows a list of basic end installations made or ordered to date. Many additional installations are contemplated.

The all basic furnace consists of a basic main roof added to a furnace equipped with basic ends. Two such furnaces are operating in the United States and Canada. The basic main roof is fully suspended. Best results have been obtained with specially-grain-sized, chemically-bonded chrome-magnesite brick steel plated with the plates an integral part of the brick.

Advantages of the all basic furnace are (1) a materially increased furnace production rate, (2) long furnace campaigns, and (3) the possibility of lowered operating costs. The increase in furnace production rate has been about 15 pct because of both faster melting rate and decreased downtime. Length of furnace campaign has been almost 500 heats in several instances. Cost data have shown higher costs on all basic furnaces than on conventional silica furnaces largely because of higher fuel costs and roof refractories material costs. With further improvements in furnace combustion, brick and design of roofs, both of these costs should be decreased to such a point that the costs of the all basic furnace will be equal to or lower than those of silica furnaces.

The overall economy of all basic furnaces is very difficult to evaluate at present. The production advantage such furnaces offer suggests the possibility of decreasing the number of furnaces required for a given production. Resulting savings in capital expenditures are particularly difficult to evaluate. The value of the extra production from converted furnaces is also intangible at the moment. Undoubtedly, with relatively small improvements in rafractories and combustion, the use of the all-basic furnace will be an advantageous and economical openhearth procedure.

### Open Hearth Mixer Linings

The choice of lining material that offers the greatest economy for openhearth mixers depends largely upon mixer operation. Mixers operated at relatively high temperatures, over 2300°F, require for optimum economy, refractories different from those needed for operations at temperatures under 2150°F.

Refractories in openhearth mixers are worn by slag floating on top of the metal and by mechanical action. The effect of mechanical action, that is, washing action by streams or currents in the metal, can be corrected only by changing mixer design. Slag action can be minimized by operating at relatively low temperatures, but such operation is not always possible.

For mixers operating at high temperatures, chemically-bonded, magnesite-chrome brick usually offers the most economic service. Occasionally such brick are set in a band around the slag line of the mixer. Such bands give excellent results. Sillimanite brick have also been used successfully in this way, but because of their relatively high price are not thought to be as economical in most cases.

For mixers where lower temperature conditions prevail, high heat duty fire-clay brick have rendered good service at low costs. The best clay brick for this application have been hard-fired, dense, low porosity brick which resist slagging action strongly. The hard-fired blast furnace brick described earlier in this paper would be particularly suited to this application, but no

**TABLE I**

**Basic-End Open Hearth Installations**

| | Furnace No. | Date Installed |
|---|---|---|
| Steel Co. of Canada, Hamilton, Ont. | 7* | Jan. 1943 |
| Steel Co. of Canada, Hamilton, Ont. | 16** | April 1944 |
| Armco Steel Corp., Middletown, Ohio | 7 | Oct. 1944 |
| Ford Motor Co., Dearborn, Mich. | 8 | Feb. 1945 |
| Armco Steel Corp., Middletown, Ohio | 5 | Dec. 1945 |
| Armco Steel Corp., Middletown, Ohio | 6 | April 1946 |
| Steel Co. of Canada, Hamilton, Ont. | 12 | Aug. 1946 |
| Armco Steel Corp., Middletown, Ohio | 8 | Sept. 1946 |
| Carnegie-Illinois Steel Corp., South Works, Chicago | 10** | June 1947 |
| Armco Steel Corp., Middletown, Ohio | 2 | July 1947 |
| Carnegie-Illinois Steel Corp., Homestead Works, Munhall, Pa. | 53 | July 1947 |
| Armco Steel Corp., Ashland, Ky. | 8 | Aug. 1947 |
| Laclede Steel Co., Alton, Ill. | 2 | Aug. 1947 |
| Youngstown Sheet & Tube, Brier Hill Works, Youngstown | 4 | Aug. 1947 |
| Lukens Steel Co., Coatesville, Pa. | 24 | Oct. 1947 |
| Sheffield Steel Corp., Houston | 7 | Oct. 1947 |
| Carnegie-Illinois Steel Corp., South Works, Chicago | 11 | Feb. 1948 |
| Sheffield Steel Corp., Houston | 6 | Mar. 1948 |
| Granite City Steel Co., Granite City, Ill. | 23 | Mar. 1948 |
| Armco Steel Corp., Middletown, Ohio | 3 | April 1948 |
| Bethlehem Steel Corp., Johnstown, Pa. | 61 | May 1948 |
| Carnegie-Illinois Steel Corp., Gary | 58 | May 1948 |
| Jones & Laughlin Steel Corp., Otis Works, Cleveland | 9 | June 1948 |
| Sheffield Steel Corp., Houston | 3 | June 1948 |
| Sheffield Steel Corp., Houston | 5 | June 1948 |
| Inland Steel Co., Indiana Harbor, Ind. | 32 | Aug. 1948 |
| Sheffield Steel Corp., Houston | 2 | Aug. 1948 |
| Sheffield Steel Corp., Houston | 1 | Sept. 1948 |
| Armco Steel Corp., Middletown, Ohio | 4 | Dec. 1948 |
| Sheffield Steel Corp., Houston | 4 | Dec. 1948 |
| Laclede Steel Co., Alton, Ill. | 3 | Jan. 1949 |
| A. S. & W. Co., Duluth | 9 | Feb. 1949 |
| A. S & W. Co., Duluth | 8 | Mar. 1949 |
| Republic Steel Corp., Buffalo | 6 | May 1949 |
| Armco Steel Corp., Ashland, Ky. | 7 | May 1949 |
| Carnegie-Illinois Steel Corp., Edgar Thomson, Bessemer, Pa. | 15 | July 1949 |
| Armco Steel Corp., Ashland, Ky. | 6 | Aug. 1949 |
| Weirton Steel Co., Weirton, W. Va. | 1 | Sept. 1949 |
| Wheeling Steel Co., Steubenville, Ohio | 6 | Sept. 1949 |
| Wisconsin Steel Co., South Chicago | 11 | Sept. 1949 |
| Central Iron & Steel Co., Harrisburg, Pa. | ... | Scheduled 1949 |
| Granite City Steel Co., Granite City, Ill. | 24 | Scheduled 1949 |
| Laclede Steel Co., Alton, Ill. | 1 | Scheduled 1949 |
| Laclede Steel Co., Alton, Ill. | 4 | Scheduled 1949 |
| Sheffield Steel Corp., Houston | 8 | Scheduled 1949 |
| Sheffield Steel Corp., Kansas City | ... | Scheduled 1949 |
| Steel Co. of Canada, Hamilton, Ont. | ... | Scheduled 1949 |

* One end only, later dismantled.

** All basic furnace.

FIG. 4—New basic brick front wall in an openhearth furnace.

one has used such brick in this application as yet.

Another refractories practice worthy of comment is the use of sillimanite mortar in laying up mixer linings. The joints in mixer linings are usually the locations attacked first and hardest. Sillimanite mortar, used in the joints and brushed over the entire interior surface of fireclay linings, tends to inhibit slag attack and yield lower refractories costs.

Refractories problems in mixer ladles are almost identical with those in openhearth mixers. Fireclay brick of various qualities have been used, their properties necessarily including high density and low porosity. Natural siliceous stone has also been used in some places. It could be expected that improvement in refractory life and lowered refractories costs would result from the use of high fired brick, developed for blast furnace linings, laid in sillimanite mortar.

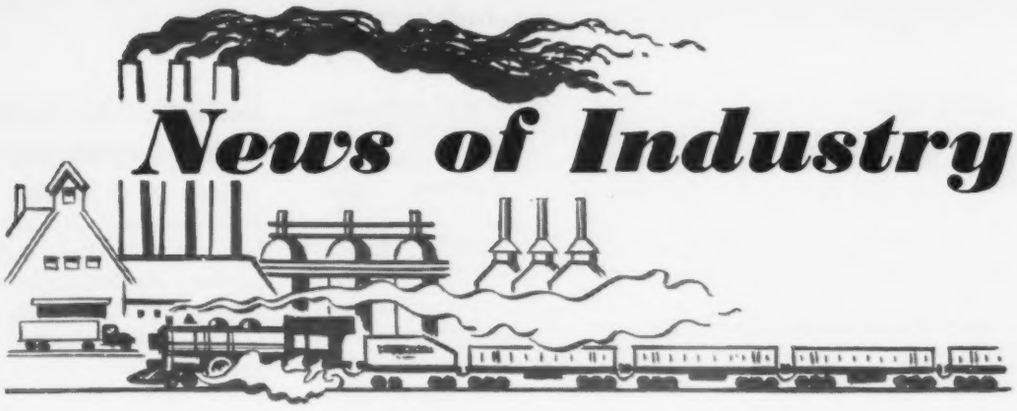
### Basic Brick in Soaking Pits

The common practice has been to use basic brick in the lower wall sections above and below the slag line in soaking pit walls. Various basic refractories have been used. Recently, steel-plated, chemically bonded magnesite-chrome brick in this application have given superior service and have lowered costs. Such brick have also been found particularly suited to the walls of the burner port openings in center fired pits. Covering the outside of the burner port with a layer of plastic chrome ore has shown beneficial results. The steel-plated magnesite-chrome brick have also rendered exceptional service in the curbing forming the lip of the soaking pit walls.

Steel-plated magnesite-chrome brick succeed in these applications because the high magnesite content brick is chemically resistant to the fluxing action of the iron oxide scale with which it comes in contact; these brick bond together due to reaction between the brick and the oxidized plate to form an almost monolithic, strong, mechanically stable wall, and giving high resistance to spalling action.

Another relatively new practice is the use of chemically-bonded chrome-magnesite brick in the bottoms of forging furnaces. Chrome-magnesite construction has been found decidedly economical, particularly in slot type furnaces where high temperatures and severe operating conditions exist. Chemically-bonded chrome-magnesite brick have low thermal conductivity, are little affected by slags or scale and offer excellent spalling resistance. These factors adapt them almost ideally to this application, and they yield low refractories cost.

In summary, then, refractories costs can be lowered generally by studying carefully all the factors involved and by selecting properly the refractory material to be used. New developments in refractory materials and in applying refractories also offer possible savings through increased refractory life and decreased labor costs. In all of these considerations, however, the particular problems of individual cases must be studied in all their aspects for optimum results.




# Consumers Start a Run on the Steel Bank

**Warehouses trying to take up the shock . . . Their business is hectic . . . Some have already closed . . . Others will follow as stocks are depleted**—*By D. I. BROWN*

Chicago—On Oct. 1 steel consumers started a run on the bank. Warehouses are trying to take up the shock of the strike and business is hectic. Some customers were buying heavily the week before the strike, but starting Oct. 1 a lot of customers went after all the steel they could get.

By Monday Chicago warehouses were out of many sizes although some of them only had 60 to 70 pct of all sizes they list in their stock lists prior to the mill shutdown. Larger warehouses are restricting sales to old customers and trying to stick to regular tonnage lots, but customers are pressing for mill quantities. The increased demand has already been reflected in free market prices. Brokers and opportunists acted quickly and cold-rolled sheets in Chicago on Monday had already reached a 1¢ premium asking price per pound.

**Galvanized Sheets Tightest**

Flat-rolled stock, particularly galvanized sheets, is the shortest item. Most warehouses report that if the present pressure continues they will be out of these stocks in from 2 to 3 weeks. Other items may last 4 weeks. Hot-rolled bars aren't too bad but cold-finished bars picked up plenty. A few warehouses have been surprised by the pickup in stainless demand and even brass.

The pressure got so tough on one large warehouse that they called in all their salesmen to help man the telephones. This company reported conditions were worse than the 1946-47 shortage days. Evidently the majority of warehouse accounts had not ordered ahead as a strike hedge. Also obvious is that approximately one half of them didn't expect a

*Turn to Page 100*

## K-F Granted RFC Loan

**Washington**—A loan amounting to $34.4 million to Kaiser-Frazer Corp. has been granted by the Reconstruction Finance Corp. which said the money is to be used to complete the firm's line of cars.

This is the first loan by RFC to the car-making end of the Kaiser enterprises. Speculation was strong, however, that the oft rumored low-price K-F car is out of the planning stage and that the loan might be used for tooling up for production some time next year.

## Everybody Loses

**New York — Everyone loses during a strike, and this one is no exception. Every week that the strike lasts the steelworkers lose $30 million in wages. Since wages aren't a part of the controversy, no part of this loss will be recouped when the strike is settled. These wages are lost forever.**

**The companies lose 1.4 million tons of steel production every week the strike lasts. However, some of this loss can be made up after the strike is settled.**

**But these figures cover only basic steel firms. As each additional manufacturing plant's operations are curtailed or halted by lack of steel both wage losses and production losses are increased.**

## New Construction Rises

**Washington**—New construction for September was estimated by the Commerce Dept. at about $1.9 billion, bringing the total for the three quarters to $14 billion. This figure is 1 pct more than last year.

Private construction declined $625 million for the 9-month period, but an increase of $800 million in public works more than made up the difference.

Industrial building continues off from last year, about 27 pct, while commercial building has declined about 15 pct. On the other hand, public utilities work is up 10 pct over 1948—and accounts for nearly a third of all privately financed construction.

## Run on the Steel Bank

*Continued from Page 99*

strike. The third conclusion that can be reached is that they now expect a long tie-up.

Mills shipped heavy tonnages the last few days. Billings on these cars are behind and many cars were received last week without any papers. One car reached a large Chicago warehouse without identification as to any shipper. Such shipments are being unloaded with the hope that the proper billings will soon come in so that proper identification and payment can be made.

**Inventories Are Unbalanced**

As the warehouses run out of supplies, industrial activity here will slow down. Although good inventories are on hand in some items, the general inventory picture is unbalanced. Unless that deficiency can be rectified, fabricators and producers of many metal items will be forced to close within 3 to 4 weeks. The few steel mills now producing are not capable of stalling off the steel famine, except in a few isolated areas.

In this area the U. S. Steel Supply Co.'s warehouse is closed. Out of 14 units U. S. Steel Supply has five warehouses closed nationally and they are Pittsburgh, Boston, Newark, St. Paul and Chicago. J. T. Ryerson & Son's Boston plant was down with Cleveland, Pittsburgh and Cincinnati operations in question. Central Steel & Wire had all units in action but their Detroit warehouse, they reported, might go down momentarily. All of A. M. Castle & Co.'s units were working early in the week and J & L's warehouse will continue to operate here.

*Resume Your Reading on Page 99*

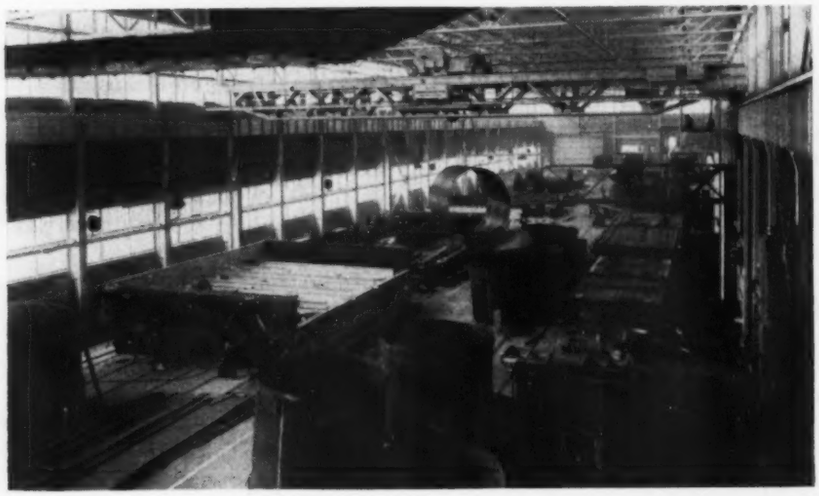
## Ordered to Stop Trade Curbs

**Washington**—Holding that it had been in violation of the antitrust act, the Federal Trade Commission recently ordered the C. Lee Cook Mfg. Co., of Louisville, to discontinue the use of exclusive dealing contracts, granting of conditional discounts, and agreements or understandings as to retail pricing.

## Washer Sales Increase

**New York** — Factory sales of standard-size household washers in August totaled 323,789 units. This represents an increase of 61 pct over July and was within 10.6 pct of 362,169 sold in August 1948, the industry's all-time high year.

CANADIAN ACTIVITY: Canadian expansion has resulted in manufacturing work for many plants. Some of this work is shown in Dominion Bridge's new general assembly shop. Work currently in progress through the shop is largely for Ontario Hydro's multi-million dollar power developments and includes control gates, bedded parts, scroll case and penstock sections.



## Meehanite Tells Foundries Nodular Graphite Iron Is Ready

**New York** — The Meehanite Metal Corp., New Rochelle, N. Y., has notified all foundries which produce Meehanite castings under contract with them that they have established production techniques and procedures which will enable them immediately to undertake the production of a nodular graphite Meehanite metal on a commercial scale.

The company said that for many years Meehanite foundries had been manufacturing a variety of materials whose properties were dependent upon close and accurate control of both the graphite and base structure, and such controls are essential fundamentals in the production of Meehanite castings. Research on the form, quantity and method of distribution of graphite has in fact been constant, including studies of various alloys and treatments, which result in nodular graphite formation.

**Research Began In 1926**

"As a matter of fact such research dates back as far as 1926 when O. Smalley, now President of Meehanite, presented a paper before the American Foundryman's Assn. describing the use of magnesium-silicon additions to affect undercooling of cast iron followed by graphitizing treatments with ferrosilicon.

As a result of recent work Meehanite metallurgists have developed a new and unique process of making nodular castings, including a special device and means of treatment that assures accurate control of the physical properties."

## Submits Arms Standards

**Washington**—A list of tentative recommendations, aimed at standardizing and reducing the regular types of weapons, ammunition, and major items of equipment for the Army has been submitted to Army Secretary Gordon Gray.

## Aluminum Demand Rises; Production Facilities Added

**Increased demand for aluminum products keeps reduction plants busy.**

**New York**—There has been an important improvement in the demand for aluminum products since the low levels of the summer. Reynolds Metals Co. reopened two of the four potlines at Jones Mills, Ark., last week, only a few weeks after the ending of the strike at this plant and at the Hurricane Creek, Ark., alumina plant.

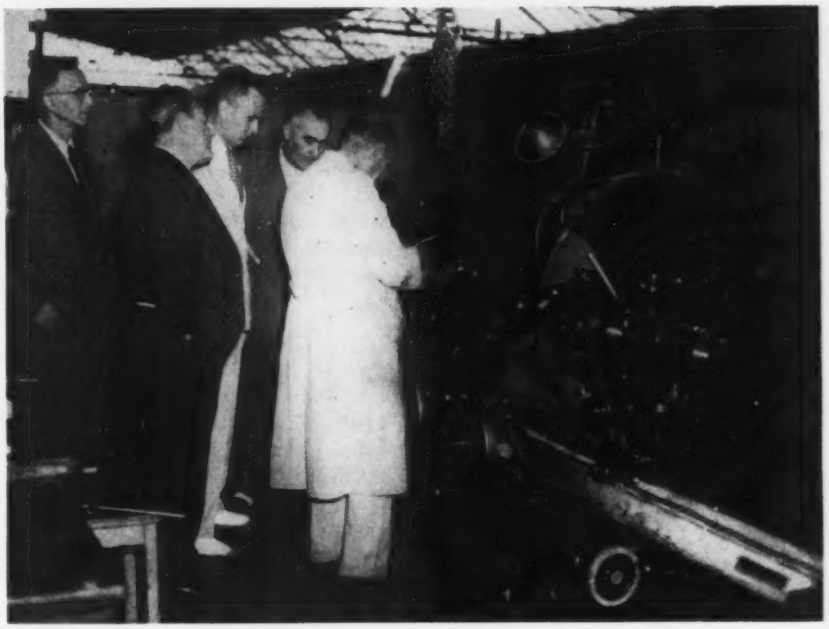
The two potlines will add a total of 6 million lb a month to national aluminum ingot production. When the Hurricane Creek plant was reopened at the end of the strike, company officials indicated that the Jones Mills plant would not be reopened for some time, due largely to the state of the aluminum market.

**Opens Reduction Plant**

The reopening of the Jones Mills reduction plant was announced in Arkansas by J. Louis Reynolds, vice-president of operations. The development followed closely after the announcement by Henry J. Kaiser that sales of aluminum in September by Permanente Metals Corp. had been 60 pct greater than the average for the previous 3 months.

Although it is still too early to see the immediate effect of the steel strike on aluminum demand, aluminum industry officials expect to find some consumers turning to aluminum to replace scarce steel products. This development depends somewhat on the length of the steel strike because any widespread closing down of appliance makers would react very quickly on aluminum order volume.

The basis for the Reynolds Metals Co. settlement with the United Steelworkers of America was a 7¢ per hr increase covering wage increase and fringe benefits. The union asked for total benefits of 12½¢ an hr. The company's original offer was 4¢ an hr. The USW covers both of the Reynolds Arkansas plants and the Troutdale, Ore., reduction plant. Their other plants are covered with AFL unions with which contracts have already been renegotiated.



AMERICAN AID: A mixed group of Greek government and Economic Cooperation Administration officials visit the workshop of YEKA, the transport agency of the Greek government. Lycourgos Rigos, an English-speaking machine shop foreman in the workshop of YEKA, explains the operation of an American crankshaft grinding lathe.

## Central Iron Signs On A Non-Contributory Basis

**New York**—Central Iron & Steel, Harrisburg, Pa., last week signed a contract with the United Steelworkers of America which will permit the company to continue operations. The company granted 4¢ an hr for insurance and 6¢ an hr for pensions, the funds to be held in escrow until the plan is finally worked out. They have until Mar. 1, 1950, to work out the plan in its final form. The contract runs to May, 1951.

The union held out for both pensions and insurance on a non-contributory basis, and the company finally agreed to sign.

Because of the added cost of this labor contract, as well as recent increases in the cost of raw materials, especially scrap, the company raised steel prices by $5 a ton. Recent improvements have boosted its plate capacity to 450,000 net tons.

## Major Industries Spending Less in '49 for Plant Expansion

**Washington**—Electric and gas utilities and railroads expect to spend more for new plants and equipment in 1949 than in 1948. But all other major industry groups expect to spend less, according to the Security & Exchange Commission and the Commerce Dept.

The overall total is expected to run $17.9 billion, about 7 pct under last year but still higher than in 1947 when the total was $16.2 billion.

Actual expenditures for the first half 1949 amounted to $9.1 billion, more than 1948. But spending for the last half is expected to be under last year with an estimated $4.5 billion for the third and $4.3 billion for the final quarter.

## Gas Range Shipments Up

**New York**—Gas range shipments for August showed an increase of 64 pct over July. Shipments were 187,000 units in August as compared with 113,900 units during July.

# INDUSTRIAL SHORTS

**BRINGING WISDOM** — Ben F. Bregi, executive engineer, NATIONAL BROACH & MACHINE CO., Detroit, accompanied by Charles C. Clinton, sales engineer, left recently to lecture on modern methods of gear manufacture before organizations of engineers and production men in all chief industrial centers of Europe.

**HOUSE WARMING** — Completion of an entirely new factory at Jackson, Mich., has been announced by CLARK EQUIPMENT CO. The opening was the occasion for a "Family Day" attended by the company's Jackson Div. employees and their families.

**A SAVINGS**—A price reduction of 10 pct on all standard blanks in package quantities has been announced by CARBOLOY CO., INC., Detroit. There is also a new quantity discount of 5 pct on individual orders for 5 to 9 identical packages of standard tools and blanks in package quantities for immediate delivery.

**FIELD OFFICE**—A new sales office for Kaiser aluminum has been established by the PERMANENTE PRODUCTS CO. at 45 Exchange St., Rochester, N. Y. George Kurachek is sales representative in charge.

**TESTING LAB**—A new laboratory and research building adjacent to its plant has just been completed by EDWARD VALVES, INC., East Chicago, Ind.

**GROWING**—SIMONDS ABRASIVE CO., Philadelphia, has announced the opening of branch offices and warehouse stocks of grinding wheels and abrasive grain at 8829 Hubbell Ave., Detroit, and 1350 Columbia Road, Boston.

**STARTING OUT** — Clayton B. Herrick, formerly editor of Industry & Welding magazine, has formed the C. B. HERRICK CO., 1935 Euclid Ave., Cleveland, which will specialize in the handling of fabricating and auxiliary welding equipment.

**BUYS ON COAST**—The assets of the Andersen-Carlson Mfg. Co., Torrance, Calif., producers of electrical metallic tubing, has been acquired by the ROME CABLE CORP., Rome, N. Y. The transaction will be completed shortly after the first of the year. No change in personnel is contemplated.

**FOREIGN MARKETS** — The Riverside Metal Co., Riverside, N. J., has appointed the INTERNATIONAL BRASS & COPPER CO., INC., New York, as its exclusive export agent. Riverside's products include phosphor bronze, nickel silver, cupro nickel and beryllium copper alloys.

**ENLARGING** — STERLING BOLT CO., Chicago, has acquired the former Mills Industry plant at Lake St. & Kilpatrick Ave., Chicago. Sterling is a manufacturer of bolts, screws, rivets and other fastenings.

**ENGAGES SERVICES** — The Atomic Energy Commission has signed a contract with BLAW-KNOX CONSTRUCTION CO., Pittsburgh, for architect engineering services involved in the construction of a materials testing reactor. The cost is estimated at about $1,870,000.

**TAKES OVER FOUNDRY** — The nonferrous foundry facilities of the Phosphor Bronze Smelting Co. at 2200 Washington Ave., Philadelphia, will now be operated by the BROWN FOUNDRY CORP. William G. Brown is president of the new corporation.

## New England Council Forms Steel Mill Organizing Corp.

**Boston**—The Steel Committee of the New England Council authorized last week the formation of a New England steel mill organizing corporation, regarded as an important step in building a $200 million steel plant in this area.

With this announcement, Dudley Harmon, executive vice-president of the New England Council, said, "The time is relatively near for the corporation to do business with the proper parties."

Though no officers have been named, the corporation will be able to take options on sites, employ engineers and make contracts, Mr. Harmon added. The Lynn General Electric district and the Hingham Shipyards are favored as plant sites, but other communities are vying for it, too.

## Plans Test Run on Magnetite

**Quebec**—Early in October, Mag-Iron Mining & Milling, Ltd., is planning to conduct a test run of high-grade magnetite concentrates at its mill north of Millbridge in Hastings County, Ontario.

During this period of testing, data will be obtained which will be used for expansion of production capacity and necessary improvements and additions to machinery to provide uniformity in analysis in all required screen sizes. Previously, concentrates running as high as 72.4 pct Fe were produced.

## ECA Allocation for Turkey

**Washington** — Authorization of $150,000 for six mobile machine shops for repair of agricultural equipment in Turkey was included in Marshall Plan approvals recently. Also approved was a minor purchase of mining machinery.

This was the first allocation made under the tentative allotment of $19 million to Turkey under the 1949-1950 ECA appropriations.

# Squeeze Is On to Force Strike Settlements

**Government pressure for settlements is expected to mount . . . First move is aimed at coal . . . Some companies already hit by short steel supplies**—By JOHN B. DELANEY

**Pittsburgh**—The squeeze play is on to force a quick end to the steel and coal walkouts before they cause irreparable damage to the nation's economy.

It wouldn't take long for this double-barreled labor upheaval to plunge the country into a severe business recession that would take months to overcome, and nobody realizes this more than President Truman.

So the President acted quickly after the steel strike began Oct. 1, despite the impression created by his labor advisers that he was inclined to let the steel crisis "simmer" for a couple of weeks before renewing attempts to bring quarreling labor and management together.

### Government Pressure Mounts

The government's first positive move came last Wednesday, fifth day of the steel strike, when Cyrus Ching, director of the Federal Mediation and Conciliation Service, summoned John L. Lewis and the coal mine operators to meet with him in Washington. This was the tip-off on the government's strategy, which is two-pronged:

(1) Get the coal mines back in operation first, because a settlement in steel wouldn't mean much if the mills were faced with a shutdown later for lack of coal. Stockpiles before the strike averaged about 45 days' supply.

(2) Meanwhile, conduct a war of nerves against the principals in both disputes by emphasizing the economic effects of the twin strikes and pointing the finger of blame at them for the disastrous consequences.

### More Fact Finders?

The President's action in the coal dispute made it apparent from the outset that he hoped to effect a truce by proposing the same approach to coal that postponed the strike in steel—a fact-finding board. Even before the meeting with Mr. Ching, Harry M. Moses, president of U. S. Steel's H. C. Frick Coke Co., said he would welcome a fact-finding investigation. Frick operates "captive" mines which feed coal to Big Steel's mills.

### Industry Is Hard Hit

In the event of a turndown on this proposal, there was some speculation that Mr. Truman might even use organized labor's pet peeve, the Taft-Hartley Act, against Mr. Lewis to force an 80-day resumption of operations while a fact-finding board with no power to make recommendations hears arguments of both sides. The President refused to use the Taft-Hartley law against his friend, Philip Murray, president of the CIO United Steelworkers of America, in the steel dispute. But he might not hesitate in the case of Mr. Lewis because he used it twice before against the mine union chieftain.

Mr. Truman has plenty of ammunition at his disposal in his cold war against the disputants in the two strikes. Economic effects of the walkouts already are being felt, and the repercussions become increasingly grave with each passing day. He had two of his cabinet members on the firing line early to point this up. Secretary of Commerce Charles Sawyer and Secretary of the Treasury John W. Snyder sounded off from the rostrum and in press conferences. Said Mr. Sawyer: "Business will

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"Any other experience besides blast furnace?"

## Vacuum Cleaner Sales Up

**Hot Springs, Va.**—Sales of household vacuum cleaners increased 35.7 pct in August over July. C. G. Frantz, secretary-treasurer of the Vacuum Cleaner Manufacturers' Assn., said that August sales this year were 7.3 pct below the 237,202 cleaners sold in August 1948. Sales for the first 8 months of this year show a decrease of 18.7 compared to last year. However, 1949 sales of vacuum cleaners are still 60 pct higher than in 1941 which was the industry's biggest prewar year.

## Acme Steel Struck, Too

**Chicago**—Acme Steel Co.'s Riverdale plant was struck Wednesday, Oct. 5 at 11 p.m., the time the plant changes shifts. Picket lines were set up and the late shift workers did not enter the plant. The strike order was issued Tuesday after negotiations ended in a deadlock on insurance.

## Hunt, GM Executive, Retires

**Detroit**—Ormond E. Hunt, General Motors executive vice-president, retired Oct. 3 following a 40-year career in the automotive industry. He will continue to serve as a member of the board of directors.

## Government Strike Move

*Continued from Page 103*

be curtailed drastically if the steel and coal strikes continue." Said Mr. Snyder: "The nation can expect a period of prosperity after the coal and steel strikes are settled."

The facts spoke for themselves, however:

In steel: More than 500,000 workers already idle and 420,000 others scheduled to walk out as contracts with fabricating firms expire. Some fabricators already have shut down for lack of steel and others will close or cutback operations within 2 to 4 weeks for the same reason. Railroads, truckers, barge lines, an automobile producer and other industries dependent on steel have furloughed thousands of employees. Enforced idleness can be expected to snowball within a short time. Westinghouse Electric Corp. said its appliance division would soon be cutback for lack of steel.

In coal: The same effect. Nearly 400,000 miners on an all-out strike since Sept. 19, following a three-day-a-week "stabilization" strike that began in early July. The walkout has been marred by dynamiting, gunfire and other violence as strikers seek to halt operation of non-union mines.

### Point In Truman's Favor

While both disputes appear to be hopelessly deadlocked, Mr. Truman has this one important fact operating in his favor, and there is every reason to believe that it will be an important factor in bringing about settlement of the strikes:

Neither management nor labor wants to be blamed for plunging the country into a depression when the signs point to a period of prosperity providing the men go back to work.

The dispute in steel is over the principle of whether the pension and insurance programs recommended by the steel fact-finding board should be paid for entirely by the companies or whether the workers should add some of their own money to it. The union insists that the producers pay all, while the companies want the workers to chip in, too.

In coal, Mr. Lewis last week was understood to have spelled out his demands for the first time: A wage increase of 95¢ a day, from $14.05 to $15; reduction of the work-day from 8 hr to 7 hr; an increase in operator contributions to the miners' health and welfare fund from 20¢ to 30¢ a ton. Mr. Lewis shut down the industry when lack of cash forced him to suspend payments from the fund.

*Resume Your Reading on Page 103*

## Senate Passes Bill Aiding The Domestic Mining Industry

**Washington**—Federal aid to the domestic mining industry was voted by the Senate last week.

A bill sponsored by Senator O'Mahoney, D., Wyo., and authorizing up to $80 million a year in aid funds was passed by voice vote.

Aimed primarily at marginal producers of copper, lead, and zinc, the bill authorizes the Interior Dept. to make "conservation and exploration" payments to producers of these and other strategic minerals and metals.

Previous legislative attempts to provide subsidies for the domestic mining industry have been vetoed by President Truman. Senator O'Mahoney told the Senate the present bill is "designed to promote exploration," and termed it "a successful effort to meet all the criticisms raised by the President."

## Dividends Decline 12 Pct

**Washington**—Publicly reported dividends for August dropped 12 pct below August 1948 to $189.6 millions, according to the Office of Domestic Commerce.

However, with a total of $1.5 billion reported, the total for the third quarter was up 5 pct over last year.

Cash payments reported for the third quarter by major industries included: Iron and steel, $106 million; nonferrous metals, $24.7 million; automobiles, $90.7 million; all machinery, including electrical, $100 million; and public utilities, $268 million.

IRREGULAR SHAPE: Shown is a hydraulic fluid bulging die for bulging aluminum shells at Hotpoint, Inc., Chicago. The press seals the drawn shell in the die and hydraulic fluid, under pressure of 2000 psi, is forced into the drawn shell bulging it to the desired contour. The fluid is then decompressed, the die opens and the bulged shell is released. The press was built by The Hydraulic Press Mfg. Co., Mount Gilead, Ohio.

## Bill Would Boost Payments And Extend Social Security

**Washington** — A House-passed bill extending social security benefits to about 11 million persons and increasing existing benefits by about 70 pct is scheduled to be taken up by the Senate early next year.

The legislation which passed the House by an overwhelming vote of 333-14 also will insure workers against permanent and total disability. The benefits in this category will be paid at approximately the same rate as those paid in retirement cases.

Taxes paid by employers and employees are scheduled to rise to 1½ pct on each in 1950, to 2 pct each in 1951, 2½ pct in 1960, 3 pct in 1965, and 3½ pct in 1970. For the past 13 years, the tax has been set at 1 pct each on employer and employee.

Philip Murray, CIO chief, urged passage of the bill in a telegram to all members of the House. He did not comment on the principle of employer-employee contributions which is incorporated in the bill.

## Harvester's Offer of 10¢ Called Inadequate by the Union

**Chicago** — International Harvester Co.'s offer of 10¢ an hr for pensions, insurance and welfare plans has been termed inadequate by the CIO farm equipment workers union. The company's offer was a contributory plan and they said that careful study over a period of months had convinced management that pensions, insurance and welfare plans "adequate to meet employee needs" cannot be provided at a total cost of 10¢ an hr.

The company further informed the union it cannot take any final position as to the type of plans the company can accept until the entire subject has been explored through collective bargaining. They invited the union to submit their ideas on plans. It was made clear that whatever form the agreement finally takes, employees will be expected to contribute enough to give them reasonable protection and security.

The committee of 150 members from Harvester's 11 plants answered in a strongly worded resolution accusing the company of a variety of anti-union provocations and demanded that the negotiators seek "a substantial wage increase."

## Supplies French Mill Bearings

**New York**—SKF Industries, Inc., received an order for 23 tons of antifriction bearings to be installed in a hot strip mill in the heart of France's Lorraine iron ore basin.

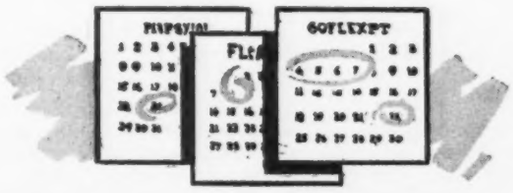
The order was placed by United Engineering & Foundry Co. of Pittsburgh, which will construct the mill for the Societe Lorraine de Laminage Continue (Sollac). It calls for 76 spherical roller bearings weighing 45,756 lb for the mill's drives and pinion stands.

## Canada Places Controls On American Steel Imports

**Ottawa**—Control over imports of primary steel from the U. S. became effective Oct. 1. Altogether 19 items have been put on the import restriction list and require import permits. About 1 million tons of primary steel shapes are imported into Canada annually from the U. S.

The plan for issuing permits will be roughly an estimate of whether identical shapes are available from Canadian mills. If they are a permit may be refused. If they are not available a permit probably will be granted. Most seriously affected may be long-term contracts between Canadian importers and steel mills in the U. S.

The discount of the Canadian dollar to 10 pct below the U. S. dollar may have greater effect on Canadian imports of U. S. steel since it adds just this much to the Canadian buyer's price.



## Dates to Remember

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|---|---|---|
| Oct. | 12-15 | **Electrochemical Society,** semiannual meeting, Chicago. |
| Oct. | 13-15 | **Foundry Equipment Manufacturers Assn.,** annual meeting. White Sulphur Springs, W. Va. |
| Oct. | 17-20 | **American Gas Assn.,** annual convention, Chicago. |
| Oct. | 17-21 | **National Metal Congress,** Cleveland. |
| Oct. | 24-26 | **American Gear Manufacturers Assn.,** annual meeting, Chicago. |
| Oct. | 26-28 | **National Metal Trades Assn.,** annual convention, Chicago. |
| Oct. | 27-28 | **Gray Iron Founders Society,** annual meeting, Chicago. |
| Oct. | 27-28 | **Porcelain Enamel Institute,** annual meeting, French Lick, Ind. |
| Oct. | 27-29 | **American Society of Tool Engineers,** semiannual meeting, Montreal. |
| Oct. | 28-29 | **Engineers Council for Professional Development,** annual meeting, Chicago. |
| Oct. | 30-Nov. 2 | **National Tool & Die Manufacturers Assn.,** annual meeting, New York. |
| Oct. | 31-Nov. 2 | **Packaging Machinery Manufacturers Institute,** annual meeting, Chicago. |
| Oct. | 31-Nov. 3 | **American Institute of Steel Construction,** annual convention, White Sulphur Springs, W. Va. |
| Nov. | 7-10 | **American Institute of Chemical Engineers,** annual meeting, Pittsburgh. |
| Nov. | 10-11 | **National Foundry Assn.,** annual meeting, New York. |
| Nov. | 30-Dec. 2 | **Society for Experimental Stress Analysis,** annual meeting, New York. |

## Illinois Waterway Slated For Repairs During the Winter

**Chicago**—Army Engineers have scheduled repairs to the Lockport lock of the Illinois Waterway to begin with the big freeze which generally takes place between Jan. 1 and 15. Repairs have been put off for a number of years because of war and postwar transportation urgencies but must now be made in order to preclude an unexpected breakdown in this important segment of the Illinois Waterway System.

This is one reason that barge operators will not ask the government to keep the waterways open throughout the winter season this year. Barge operations will be continued without the benefit of government sponsored ice breaking programs.

In order to meet any emergency, which may develop because of the lock repair program, consideration is being given to building a pipeline and necessary pumping equipment to transfer petroleum shipments around the closed locks. Should the coal strike continue for very long, it is expected that an increased demand for petroleum will have to be met. Barge operators like John I. Hay Co. plan to use trucks for transfering cargoes around the closed portion of the canal.

## Norwegian Ore Mine Being Rebuilt With Funds from ECA

**Only 10 miles from Russian border, it will be Europe's most modern.**

**Washington**—Less than 10 miles from the Russian border in northern Norway, the South Varanger Iron Ore Co. is completely rebuilding the nation's chief iron ore mine with the aid of Marshall Plan funds and American engineering.

When completely restored, the mine will constitute about 75 pct of Norwegian iron ore concentrate production. The ore itself is about 30 pct iron and, when reduced to concentrate form, about 66 pct.

By the end of 1951, the mine is expected to be producing at the rate of 500,000 tons annually. Output is expected to double over the ensuing 12 months.

Since the former facilities were completely knocked out by bombing and intentional dynamiting, the rebuilding will begin from scratch. The completed works will represent the most modern mining operation in Europe. Under sponsorship of the ECA, mining technicians have been in the U. S. studying American methods.

A NEW START: The South Varanger iron mine in northern Norway, severely damaged during the war, is being completely rebuilt with the aid of Marshall Plan funds. An antiquated power shovel is shown loading ore into a waiting freight car. Faster production methods planned for the future will do away with this procedure when the ore will be loaded into heavy duty trucks which can move right into the mine site.

## Westinghouse to Talk Pensions

**Pittsburgh**—Westinghouse Electric Corp. while reiterating its opposition to a fourth-round wage increase, has offered to discuss with its unions an improved contributory pension and social insurance program to cover the company's 90,000 employees.

W. O. Lippman, vice-president in charge of labor relations, recalled that Westinghouse last year offered such a plan but that union representatives preferred to take a wage increase.

"Recent developments have only served to emphasize the value of such a security program," he said. "Consequently we are recommending to the unions that management develop a new tentative proposal as a basis to start collective bargaining on or about Nov. 1, 1949, with the objective that such a plan might be established early in 1950."

## Burgess Talks on Nodular Iron

**Cleveland**—Development of new nodulizing alloys and operating methods favorable to the production of nodular iron were the subject of an address by Charles O. Burgess, technical director, Gray Iron Founders' Society, at the ninth New England regional foundry conference at Massachusetts Institute of Technology, Cambridge, Mass., Oct. 7-8.

The conference was sponsored by the Massachusetts Institute of Technology, the New England Foundrymen's Association and other metalworking industry associations.

## India Revises Trade Policy To Cut Imports in Second Half

**Washington**—Under revision of its trade policy, India is drastically cutting that nation's imports from both hard and soft money countries for the remainder of 1949. Imports will be strictly limited to essential raw materials and machinery (and technical and educational books).

Diesel engines, industrial sewing machines, belting, automobiles, electric motors and generators, gasoline engines, precision and measuring tools are among the major items added to the list of goods which will not be imported from dollar areas.

Passenger cars will be imported only from soft currency countries in a knocked-down condition, and will be limited to a percentage of previous imports. Trucks will be licensed for import, however, from both the United States and Canada.

American exports to India amounted to $196 million for first half 1949, a 12 pct increase over 1948. However, no licenses for import of U. S. goods had been issued since July 1.

Tightening up of imports was not based on recent currency devaluation (the rupee by a third). The new regulations became effective prior to devaluation.

## Plant Marks 50th Anniversary

**Milwaukee**—A plant tour on Oct. 7 by the officers and directors of the Allis-Chalmers Mfg. Co. will initiate a 3-day program marking the 50th anniversary of the firm's Boston works.

## Reveal New Polishing Method

**Columbus, Ohio**—Reductions in finishing costs of as much as 50 pct are claimed for a metal polishing process recently developed here by Battelle Memorial Institute. Chemical baths consisting of mixtures of acids at temperatures from about 70° to 200°F put a bright, reflective surface on complicated shapes. Neither electrical nor buffing operations are involved in the new technique; simplicity is its outstanding advantage.

## Ingot Production Sets Record

**Toronto**—Canadian production of steel ingots and castings registered a new all-time half year record for the first 6 months of 1949, totaling 1,618,484 net tons, and compares with 1,537,013 net tons in the 1948 period and 1,483,281 tons in 1947.

For June this year output totaled 270,455 net tons, for a daily average of 85.7 pct of total rated capacity and compares with 293,179 tons in May when the rate was 89.9 pct, and with 259,365 tons in June 1948.

Comparative monthly production figures for 1949 in net tons follow:

| 1949 | STEEL INGOTS | STEEL CASTINGS |
|---|---|---|
| January | 275,987 | 8,720 |
| February | 249,009 | 10,262 |
| March | 287,885 | 10,576 |
| April | 260,319 | 9,649 |
| May | 283,808 | 9,371 |
| June | 261,476 | 8,978 |
| Total 6 Months | 1,618,484 | 57,557 |

"Around here we say 'one moment please.' Not 'keep your shirt on'!"

## Basic Steel Work Injury Rate Sets New Safety Record

**Washington**—The iron and steel industry turned in new safety records during first-half 1949, according to a summary for the period by the Bureau of Labor Statistics.

Work injuries in the industry and its related fabricated products (not including machinery) not only were fewer in number but also occurred less often per million hours worked. No increase over 1948 was recorded in any of the 24 occupations listed.

Greatest decrease percentagewise was noted among workers in basic steel where the rate dropped from 7.4 million to 6.2 injuries per million hr. For the second quarter 1949, the rate dropped to 5.8. Although steel container fabrication rates rose during the second quarter, the rate for the half was still below the 1948 average.

For manufacturing as a whole, injury frequency rates were 6 pct lower in the second quarter than in the first and 18 pct lower for the half than last year.

A total of 177,000 injuries occurred which caused a loss of one or more days, of which 300 were fatal and 4400 others caused permanent disability. Injuries resulted in a loss of 1.7 million work days.

## Amertool Receives Bank Credit

**New York**—The Export-Import Bank has established a revolving credit of $3 million to Amertool Services, Inc. Amertool is an export financing corporation organized by a group of 11 American manufacturers of machine tools to offer export time-payment credit.

The credit will assist in financing export of machine tools to customers in Latin America for purposes which will add to the productive capacity of these countries and enhance their ability to earn dollars. The bank's credit assistance is conditional on all losses first being absorbed by Amertool's own reserves to the extent such reserves are adequate.

*Viewing the News from*

## The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

### *"Labor Logic And Labor Politics"*

A MILLION workers have quit their jobs in the steel industry and paralyzed the hard backbone of American economy.

The issue which separates the employers from the strikers seems, on the surface, a wholly inadequate cause for a declaration of industrial war. The steel companies are willing to pay 10¢ for pensions and social security as recommended by the Steel Fact Finders' Report to the President. This had previously been stipulated by Phil Murray as the minimum for which the union was willing to settle. The sole issue, apparently, is whether the worker should be compelled to provide additionally for his own old age and illness.

The argument of the workers is that noncontribution has already been established as a principle throughout American industry; that top officials of the big steel companies themselves are beneficiaries of pension plans to which they make no contribution; that such plans currently prevail in the railroad, coal mining, automotive, banking, and many other industries. Under federal social security the workers do make a contribution, so that actually the protection which they receive in old age and adversity is something to which, in fact, they have made a contribution.

On the other side, the leaders of the steel industry feel that the principle here involved is vital and that the only hope for preventing an abuse of pension and social security costs is to insist on some contribution by the worker himself. They can point to such abuse, already reaching extreme stages, in other parts of the world. In the metallurgical industry in the Paris area, pensions and social security add 42 pct to the total wage bill. In the French railway system these costs equal 80 pct of total labor costs.

Labor in this matter, as in other issues, reveals a complete flexibility in the use of logic. It readily borrows the language of the steel board in presenting its case. "Social insurance and pensions should be considered a part of normal business costs to take care of temporary and permanent depreciation in the human 'machine,' in much the same way as provision is made for depreciation and insurance of plant and machinery."

This represents a complete somersault in labor reasoning. For more than half a century labor has argued that it is not a commodity, that it is an offense to the human character—the "divine" spark in every worker—to compare him to inanimate merchandise or livestock that are bought and sold in the market place. The whole purpose of this position has been to exempt labor from the definitions and the sanctions of our antitrust laws.

Such polemic agility has become commonplace in labor advocacy. Since the end of the war it has argued strenuously for rising wages when the cost of living was going up, while conveniently rejecting the same reasoning when cost of living was going in the other direction. Similarly, when companies are making a lot of money, the worker clamors for a share in profits. His leaders are eloquently silent when operations leave the employer in the red.

Perhaps the real key to labor thinking and labor conduct is to be found in the tremendous pressure operating on labor leaders at all times to preserve their jobs and influence. Phil Murray has just been needled pointedly by Bill Green for his failure to demand a wage increase. Mr. Murray and all his followers have before them the examples of Lewis in coal and Reuther in automobiles. It may well be that Murray cannot afford to take any other position.

## Canadian Pig Iron Output Sets New All-Time Record

**Toronto** — Canadian pig iron production made a new all-time high record for the first 6 months of this year when output totaled 1,135,071 net tons, and compares with the previous record made in the first half of 1948 totaling 1,031,693 net tons, and with 973,153 tons for the like period of 1947.

Production of ferroalloys in June amounted to 19,264 net tons compared with 20,652 tons in the previous month and 13,502 tons in June 1948.

Following are comparative monthly production figures for 1949 in net tons:

| 1949 | PIG IRON | FERRO-ALLOYS |
|---|---|---|
| January | 183,074 | 21,931 |
| February | 172,724 | 21,713 |
| March | 202,130 | 22,457 |
| April | 180,740 | 24,427 |
| May | 202,148 | 20,652 |
| June | 194,255 | 19,264 |
| Total 6 Months | 1,135,071 | 130,444 |

## August Exports Decreased But Imports Showed a Gain

**Washington** — August general exports dropped still further from $896 million in July to $880 million, about 16 pct below the 1948 monthly average, the Census Bureau reports.

At the same time, general imports rose from $456 million to $491 million, about 17 pct below the 1948 average.

Metals and manufactures registered the largest dollar import increase, from $57 million to $77 million, due to increased purchases of foreign copper, lead and bar tin.

## Outlines Tariff Cuts

**Washington**—President Truman has outlined the procedure he intends to follow in reducing import duties under the new reciprocal trade law.

An executive order signed by Mr. Truman on Oct. 5 requires a newly-established Interdepartmental Committee on Trade Agreements to publish in the Federal Register lists of any commodities on which it seeks to cut tariffs.

## Construction This Year May Equal or Top Last Year's Total

**Due to lower material costs dollar equality means larger volume.**

**Washington** — Barring adverse seasonal factors or lengthy strikes contract construction totals for 1949 will tie last year's $18 billion plus. Overall activity through August approximates $12.3 billion for the year, a slight gain over 1948, according to Commerce and Labor Dept. reports.

In view of the pronounced downward trend in overall building materials costs, this indicates that a considerably larger physical volume is going into place.

Less than a third of the public construction, however, is being paid out of federal coffers. Of the $3.3 billion in public works through August, federal activity accounted for $1 billion. The remaining $2.3 billion was financed by state and local funds.

**Private Building Leveled Off**

All major types of public work have continued on the uptrend except sewer and water system construction. Building of schools, hospitals and institutions have shown pronounced increases and highway work a more moderate increase.

Privately financed construction has now leveled off. Industrial building, which began its slowdown last year, is now running a third less as expansion is completed. Commercial building, reaching the saturation point at mid-year, apparently is declining. The backlog of public utility work and an upturn in farm construction is supporting private construction figures.

## Contract Construction High But Output of Materials Drops

**Washington** — For the fourth consecutive month, July production of fabricated structural steel, rigid steel conduit, nails, and 11 other construction materials declined while the volume of contract construction continued at high levels, according to the Commerce Dept. index.

On the other hand, cast iron soil pipe and radiation increased in production for the third month, according to Commerce statistics.

As a whole, overall first-half production of the 20 materials included in the index ran about 10 pct less than in 1948.

## Construction Steel Awards

Fabricated steel awards this week included the following:

2500 Tons, Chicago, Veterans Hospital to J. L. Simmons Co., Chicago.
600 Tons, Haverhill and Croveland, Mass., bridge through T. Stewart and Sons, Watertown, Mass., to Bethlehem Steel Co., Bethlehem.
420 Tons, Lawrenceville, N. J., field house for Lawrenceville Academy, to Bethlehem Steel Co., Bethlehem.
300 Tons, Vermont, White River Junction road to Woodsville, N. H., for Boston and Maine R.R. through T. Stewart and Sons, Watertown, Mass., to Bethlehem Steel Co., Bethlehem.
210 Tons, Philadelphia, union medical center, through S. Yellin & Son, Philadelphia, to Grays Metal Works, Inc., Philadelphia.
200 Tons, Bradford County, Pa., bridge, Pennsylvania Dept. of Highways, Pine Brook Iron Works, Scranton, Pa., low bidder.
140 Tons, Lancaster, Chester Counties, Pa., bridge, Pennsylvania Dept. of Highways, through Edward A. Daylor, Coatesville, Pa., to Easton Steel Structures Co., Easton, Pa.

Fabricated steel inquiries this week included the following:

1900 Tons, Champaign, Ill., Chemical Research Bldg., for the University of Illinois, bids closed Oct. 15.
1500 Tons, Melville, La., pipe line suspension bridge for Continental Gas Pipe Line Corp., through Fish Constructors, Inc., Houston, general contract bids due Oct. 15.
600 Tons, Carbondale, Pa., Roman Catholic youth center, due Oct. 26.
190 Tons, Easton, Pa., manufacturing building for Victor Balata, due Oct. 18.
140 Tons, Westmoreland County, Pa., Pennsylvania Turnpike 31 F, bridge, due Oct. 18.
100 Tons, Westchester, Pa., senior high school, due Oct. 20.

Reinforcing bar awards this week included the following:

1450 Tons, Iowa City, Iowa, Veterans Hospital to Laclede Steel Co., St. Louis.
500 Tons, Cincinnati, county home to Pollock Steel Co., Cincinnati.
500 Tons, Marion, Ohio, building for Motor Products Corp., to Pollock Steel Co., Cincinnati.
120 Tons, Fall River, Mass., pier for State of Massachusetts Waterways Dept. through Henry Worthington Co., Quincy, to Northern Steel Co., Boston, Mass.

Reinforcing bar inquiries this week included the following:

940 Tons, Chicago, Wacker Drive extension.
225 Tons, Providence, R. I., expressway, consisting of earth, embankment work, bridges and service road. Completion date Dec. 31, 1950.
170 Tons, Milwaukee, Martinique apartment building.
130 Tons, Chicago, Store building for J. M. Smyth Co.

Steel plate awards this week included the following:

150 Tons, Hastings, Minn., 4 plate girder spans for the Milwaukee R.R. to American Bridge Co., Pittsburgh.

## Plans $50 Million Project

**Pittsburgh**—One of these fine days, when visitors come to town, Pittsburghers are going to be able to take them to the top of Mount Washington, overlooking the downtown area, and, with real pride, say "That's our 'Golden Triangle.'"

The first step toward a real face-lifting of the somewhat rundown lower triangle, the point that juts into the Allegheny and Monongahela where they merge to form the Ohio, was made possible recently when Equitable Life Assurance Society of New York agreed to purchase and develop a 23-acre plot and build as a starter, three 20-story office buildings.

The development will be adjacent to the 36-acre Point Park, which will materialize almost simultaneously.

At the outset, the project will involve about $50 million and, if extended over the entire area, something in excess of $100 million. The buildings are scheduled to be ready for occupancy in 1952.

## Files Application for Water Supply for Beneficiation Plants

**Cleveland** — Erie Mining Co., managed by Pickands, Mather & Co., filed application this week (Oct. 13) with the Minnesota Dept. of Conservation to obtain a water supply for proposed magnetic taconite beneficiation plants with capacity to produce 10 million tons of concentrate a year. The proposed plants would be located near Aurora, Minn., on the Mesabi range.

Erie Mining Co. is managed by Pickands, Mather for Bethlehem Steel Corp., Youngstown Sheet & Tube Co., Interlake Iron Corp. and P-M. According to Elton Hoyt, II, president of Erie Mining Co., no final decisions have been made as to whether the proposed large plants will be built, but the first plant contemplated would have a capacity to produce 2.5 million tons of concentrate a year.

For some years Erie Mining Co. has been experimenting at its laboratory at Hibbing, Minn., and last year put in operation a "preliminary" plant near Aurora, using full-scale equipment. The preliminary plant has an annual capacity of 200,000 tons of concentrate a year.

**AMERICAN IRON AND STEEL INSTITUTE**

**SHIPMENTS OF STEEL PRODUCTS**
**ALL GRADES INCLUDING ALLOY AND STAINLESS**
**(Net Tons)**

AUGUST - 1949
Month

| Steel Products | Number of companies | Items | Current Month: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons) | Current Month: Per cent of Total Shipments | Current Month: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons) | To Date This Year: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons) | To Date This Year: Per cent of Total Shipments | To Date This Year: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons) |
|---|---|---|---|---|---|---|---|---|
| Ingots, blooms, slabs, billets, tube rounds, sheet and tin bars, etc. | 47 | 1 | 135,509 | 2.8 | 122,753 | 1,747,275 | 4.1 | 1,594,397 |
| Skelp | 6 | 2 | 13,518 | 0.3 | 49,769 | 76,882 | 0.2 | 328,524 |
| Wire rods | 21 | 3 | 53,633 | 1.1 | 22,555 | 394,617 | 0.9 | 167,113 |
| Structural shapes (heavy) | 11 | 4 | 300,343 | 6.1 | 206 | 2,781,204 | 6.5 | 18,058 |
| Steel piling | 3 | 5 | 31,089 | 0.6 | - | 233,163 | 0.5 | 1,357 |
| Plates | 28 | 6 | 481,314 | 9.8 | 8,040 | 4,564,684 | 10.6 | 148,939 |
| Rails—Standard (over 60 lbs.) | 4 | 7 | 186,159 | 3.8 | 208 | 1,452,127 | 3.4 | 6,510 |
| Rails—All other | 5 | 8 | 9,650 | 0.2 | 2 | 95,197 | 0.2 | 1,470 |
| Joint bars | 7 | 9 | 9,585 | 0.2 | 1,081 | 89,073 | 0.2 | 23,382 |
| Tie plates | 6 | 10 | 36,279 | 0.7 | - | 317,616 | 0.7 | 41 |
| Track spikes | 8 | 11 | 6,887 | 0.1 | - | 79,905 | 0.2 | 35 |
| Wheels (rolled or forged) | 5 | 12 | 21,706 | 0.4 | - | 223,754 | 0.5 | 598 |
| Axles | 5 | 13 | 10,868 | 0.2 | - | * 138,696 | 0.3 | 29 |
| Hot rolled bars (including light shapes) | 40 | 14 | 465,189 | 9.5 | 35,076 | 4,852,884 | 11.3 | 492,174 |
| Hot rolled bars—Reinforcing | 24 | 15 | 155,662 | 3.2 | - | 1,114,943 | 2.6 | 2,264 |
| Cold finished bars | 33 | 16 | 85,243 | 1.7 | 951 | 934,348 | 2.2 | 5,478 |
| Tool steel bars | 17 | 17 | 4,049 | 0.1 | 15 | 40,645 | 0.1 | 478 |
| Pipe—Standard | 17 | 18 | 193,497 | 3.9 | 4,710 | 1,541,152 | 3.6 | 36,588 |
| Pipe—Line | 12 | 19 | 259,060 | 5.3 | 1,295 | *1,655,944 | 3.8 | 12,660 |
| Pipe—Oil country goods | 14 | 20 | 121,948 | 2.5 | 9,385 | *1,055,785 | 2.4 | 64,827 |
| Tubes—Boiler | 3 | 21 | 10,666 | 0.2 | 395 | 86,637 | 0.2 | 6,695 |
| Tubes—Mechanical and pressure | 21 | 22 | 45,439 | 0.9 | 960 | 479,805 | 1.1 | 12,290 |
| Miscellaneous pipe (including conduit) | 12 | 23 | 17,024 | 0.3 | 50 | 170,199 | 0.4 | 1,022 |
| Wire—Drawn | 38 | 24 | 183,644 | 3.7 | 7,441 | 1,495,305 | 3.5 | 89,218 |
| Wire—Nails and staples | 17 | 25 | 51,554 | 1.0 | 490 | 542,886 | 1.3 | 5,946 |
| Wire—Barbed and twisted | 15 | 26 | 17,427 | 0.4 | - | 168,189 | 0.4 | 32 |
| Wire—Woven wire fence | 13 | 27 | 23,831 | 0.5 | 2 | 276,535 | 0.6 | 1,504 |
| Wire—Bale ties | 12 | 28 | 4,392 | 0.1 | - | 35,127 | 0.1 | - |
| Black plate | 10 | 29 | 24,864 | 0.5 | - | 349,972 | 0.8 | 254 |
| Tin and terne plate—Hot dipped | 10 | 30 | 140,386 | 2.9 | - | 1,245,586 | 2.9 | 10 |
| Tin plate—Electrolytic | 10 | 31 | 181,698 | 3.7 | - | 1,400,325 | 3.2 | 42 |
| Sheets—Hot rolled | 28 | 32 | 495,052 | 10.1 | 59,619 | 4,602,716 | 10.7 | 462,838 |
| Sheets—Cold rolled | 16 | 33 | 658,522 | 13.4 | 965 | 4,881,045 | 11.3 | 13,057 |
| Sheets—Galvanized | 15 | 34 | 174,088 | 3.5 | 84 | 1,195,114 | 2.8 | 504 |
| Sheets—Long terne | 9 | 35 | 13,929 | 0.3 | - | 106,486 | 0.2 | 505 |
| Sheets—Enameling | 7 | 36 | 9,938 | 0.2 | - | 124,245 | 0.3 | 1,631 |
| Sheets—Electrical | 11 | 37 | 25,692 | 0.5 | - | 267,210 | 0.6 | - |
| Strip—Hot rolled | 23 | 38 | 153,053 | 3.1 | 17,119 | 1,194,504 | 2.8 | 188,629 |
| Strip—Cold rolled | 35 | 39 | 105,841 | 2.2 | 1,147 | *1,064,588 | 2.5 | * 16,310 |
| All other | 3 | 40 | 86 | - | - | * 6,019 | - | - |
| Total steel products | 138 | 41 | 4,918,314 | 100.0 | 344,318 | *3,082,387 | 100.0 | *3,705,409 |

During 1948 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

## Briefs and Bulletins

**skeptical**—Auto plants were uneasy about their steel supplies when the strike began. This week they are even more skeptical of their ability to stretch supplies to Nov. 15 or beyond. This is the date most firms had set as a minimum deadline for continued production. Two factors have added to the uneasiness: (1) As predicted, some parts makers have started screaming for help on steel. This was expected, but the industry couldn't possibly anticipate the snowballing effect of such a movement. (2) The problem of not having the right size sheet at the right time crops up when least expected.

**for sale**—Several prospective purchasers have looked over the Chester, Pa., furnace which operated briefly nearly a year ago as Allied Iron Works, Inc. The owners, Stanolind Oil & Gas Co., Tulsa, and Brown Engineering Co., Houston, are holding the furnace for a price of about $1.5 million, but there will be no pressure to sell until the pig iron market improves. All raw materials have been sold and the furnace is banked. With all equipment in standby condition, the furnace represents an investment of $3.8 million.

**buying resumed**—Eastern foundries, having run their pig iron inventories down to the ground, are now buying iron again. The business of jobbing foundries has been building up again, although at somewhat lower prices. Captive foundry business has not yet come back, and most are out trying to get jobbing business.

**ask credit**—With striking steelworkers at the Aliquippa, Pa., plant of Jones & Laughlin Steel Corp. hard-pinched for cash, Local 1211 of the United Steelworkers of America turned to full-page newspaper ads to appeal to merchants for extension of credit while the strike lasts.

**kaiser sheets**—Offerings of Kaiser inventories of 20 gage and 16 gage cold-rolled sheets are being made in the Philadelphia area at a price of 7¢ per lb. The list carries 2000 tons. This price compares with sheets in this market at about 5¢ including extras.

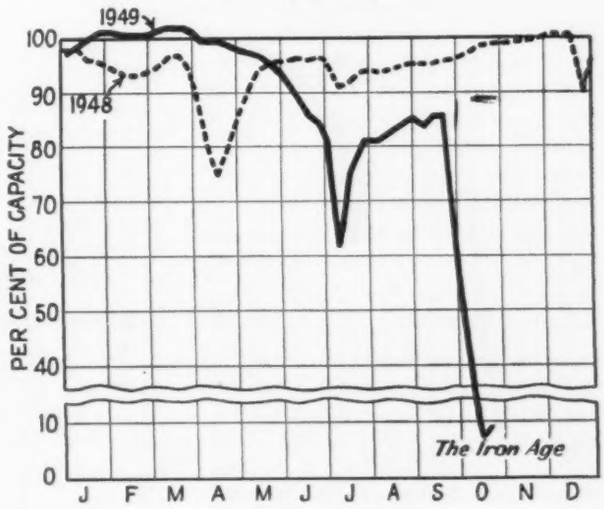
**trade pact**—Russia will ship 10,000 tons of manganese, 500 tons of ferromanganese, and 4000 tons of asbestos to Sweden under an agreement reached recently between the two countries.

**new pipe mill**—Houston, Texas, has been chosen as the site for a new electric welded steel pipe mill to be built by the Consolidated Western Steel Corp., a fabricating subsidiary of U. S. Steel Corp. in that area. Preliminary construction work has begun on property near the Houston Ship Channel. The new plant is expected to be in operation next spring. The new mill will have an annual capacity of 100,000 net tons of 24-in. diam and larger electric welded and expanded steel pipe.

**false economy**—A strike factor that is written in a little bolder hand this week is the uncomfortable truth that steel inventories that were shaved quickly to slash investments in materials a few months ago may not always have been cut wisely. One auto producer admitted to THE IRON AGE this week his firm is decidedly uncomfortable about coal. He frankly said that inventory cutbacks were the sole reason for the present stringency.

**coke prices**—Some coke suppliers are out taking business in a big way. Observers expect that there may be an advance in prices growing out of the coal and steel negotiations.

**Steel Operations**



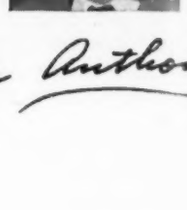

District Operating Rates—Per Cent of Capacity

| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct. 2 | 3.5 | 5.5 | ..... | 7.0 | ..... | ..... | 63.5 | 2.00* | ..... | 20.0 | 40.0 | 30.0 | 22.1 | 7.9* |
| Oct. 9 | 3.5 | 4.4 | ..... | 7.0 | ..... | ..... | 64.5 | ..... | ..... | 20.0 | 38.8 | 45.0 | 22.1 | 9.0 |

* Revised.

# Nonferrous METALS OUTLOOK

## Market Activities



by John Anthony

**Lead drops again . . . No forward buying of lead or zinc . . . Copper sales near peak tonnages . . . No tin buying . . . Skeptics scout aluminum strike.**

**New York**—Imports of Yugoslav, German and Japanese lead have had their effect on the lead market, bringing down the price by the second ½¢ in a week. Some observers believe that the bottom of the market may not yet have been reached. The pressure of import tonnages lies very heavily on the market, and prices of foreign lead are being dropped with price cuts in the domestic market. Foreign lead can be bought at 13¢ to 13¼¢, duty paid New York, which leaves a margin of about $10 a ton for freight.

The zinc market is in a less vulnerable position because the price hasn't been bid up quite so high. But zinc suffers more directly from the steel strike. Producers have benefited by increased demand for high grade from the brass mills, tonnage diverted from the strike of New Jersey Zinc Co.'s plant at Palmerton, Pa. But there is no forward buying of either zinc or lead. Some producers have apparently been selling fairly good tonnages of both metals, largely on an average monthly price basis.

The September figures of the American Zinc Institute show reduced production at 70,392 tons in approximate balance with domestic shipments of 60,220 plus increased export and government shipments of nearly 10,000 tons. Industry stocks at the end of the month reached 85,203 tons, considerably higher than early this year but well below the heavy inventories carried during the war and early postwar years.

### NONFERROUS METALS PRICES

| | Oct. 5 | Oct. 6 | Oct. 7 | Oct. 8 | Oct. 10 | Oct. 11 |
|---|---|---|---|---|---|---|
| Copper, electro, Conn. | 17.625 | 17.625 | 17.625 | 17.625 | 17.625 | 17.625 |
| Copper, Lake, Conn. | 17.75 | 17.75 | 17.75 | 17.75 | 17.75 | 17.75 |
| Tin, Grade A, New York | 96.00 | 96.00 | 96.00 | 96.00 | 96.00 | 96.00 |
| Zinc, East St. Louis | 9.25 | 9.25 | 9.25 | 9.25 | 9.25 | 9.25 |
| Lead, St. Louis | 14.05 | 14.05 | 13.60 | 13.60 | 13.55 | 13.55 |

Note: Quotations are going prices.

### Copper Market Active

The copper market is much more active than either lead or zinc. There is an underlying shortage of shape tonnage, which has been aggravated by the strike at Carteret. Observers believe that had it not been for the steel and coal strikes, an increase to perhaps 18.00¢ would have been in the cards. Deliveries of copper in September are expected to reach 95,000 to 100,000 tons, with about the same tonnage for October. Sales for October delivery are already close to 70,000 tons. Copper buying in the early fall months is only slightly lower than previous peak tonnages. But inventories at the end of September will be in the neighborhood of 200,000 tons.

The tin market is inactive, hamstrung by the steel strike. With the pressure of requirements off the market, buyers are holding back for the almost certain prospect of lower prices when the British Ministry turns the Straits tin market over to the London Metal exchange in 3 or 4 weeks.

Some factors in the aluminum industry are somewhat skeptical of a strike actually developing at the nine threatened Alcoa plants on Oct. 17. The USW could not use the settlement of an aluminum strike as pressure on the steel negotiations.

## Mill Products

### Aluminum

*(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)*

**Flat Sheet:** 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

**Plate:** ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

**Extruded Solid Shapes:** Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 84.6¢ to 76¢; 23 to 25, 96.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

**Rod, Rolled:** 1.064 to 4.5 in., 2S-F, 3S-F, 24¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

**Screw Machine Stock:** Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2¼ to 3½ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

**Drawn Wire:** Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 33.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

### Magnesium

*(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)*

**Sheets and Plate:** Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

**Extruded Round Rod:** M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2¼ to 5, 41¢. Other alloys higher.

**Extruded Square, Hex. Bar:** M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

**Extruded Solid Shapes, Rectangle:** M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

**Extruded Round Tubing:** M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

### Nickel and Monel

*(Base prices, cents per lb, f.o.b. mill)*

| | Nickel | Monel |
|---|---|---|
| Sheets, cold-rolled | 60 | 47 |
| Strip, cold-rolled | 66 | 50 |
| Rods and bars | 56 | 45 |
| Angles, hot-rolled | 56 | 45 |
| Plates | 58 | 46 |
| Seamless tubes | 89 | 80 |
| Shot and blocks | .. | 40 |

### Copper, Brass, Bronze

*(Cents per lb, freight prepaid on 200 lb)*

| | Sheets | Rods | Extruded Shapes |
|---|---|---|---|
| Copper | 31.30 | .... | 30.90 |
| Copper, h-r | .... | 27.15 | .... |
| Copper, drawn | .... | 28.40 | .... |
| Low brass | 29.47 | 29.16 | 32.38* |
| Yellow brass | 28.19 | 27.88 | 31.20* |
| Red brass | 29.89 | 29.58 | 32.80* |
| Naval brass | 33.13 | 27.19 | 28.44 |
| Leaded brass | .... | 22.76 | 26.85 |
| Com'l bronze | 30.84 | 30.53 | 33.50* |
| Manganese bronze | 36.63 | 30.54 | 32.04 |
| Phosphor bronze | 50.47 | 50.72 | .... |
| Muntz metal | 31.15 | 26.71 | 27.96 |
| Everdur, Herculoy, Olympic, etc | 36.19 | 35.14 | .... |
| Nickel silver, 10 pct | 39.12 | 41.41 | 41.44 |
| Arch. bronze | .... | .... | 26.85 |

*Seamless tubing.

## Primary Metals

*(Cents per lb, unless otherwise noted)*

| | |
|---|---|
| Aluminum, 99+%, 10,000 lb, freight allowed | 17.00 |
| Aluminum pig | 16.00 |
| Antimony, American, Laredo, Tex. | 32.00 |
| Beryllium copper, 3.75-4.25% Be dollars per lb contained Be | $24.50 |
| Beryllium aluminum 5% Be, dollars per lb contained Be | $52.00 |
| Bismuth, ton lots | $2.00 |
| Cadmium, del'd | $2.00 |
| Cobalt, 97-99% (per lb) | $1.80 to $1.87 |
| Copper, electro, Conn. Valley | 17.625 |
| Copper, lake, Conn. Valley | 17.75 |
| Gold, U. S. Treas., dollars per oz. | $35.00 |
| Indium, 99.8%, dollars per troy oz. | $2.25 |
| Iridium, dollars per troy oz. | $100 to $110 |
| Lead, St. Louis | 13.55 |
| Lead, New York | 13.75 |
| Magnesium, 99.8+%, f.o.b. Freeport, Tex. | 20.50 |
| Magnesium, sticks, carlots | 34.50 |
| Mercury, dollars per 76-lb flask f.o.b. New York | $72 to $75 |
| Nickel, electro, f.o.b. New York | 42.97 |
| Palladium, dollars per troy oz. | $24.00 |
| Platinum, dollars per troy oz. | $69 to $72 |
| Silver, New York, cents per oz. | 73.25 |
| Tin, New York | 96.00 |
| Zinc, East St. Louis | 9.25 |
| Zinc, New York | 9.97 |
| Zirconium copper, 10-12 pct Zr, per lb contained Zr | $12.00 |

## Remelted Metals

### Brass Ingot

*(Published prices, cents per lb delivered, carloads)*

| | | |
|---|---|---|
| **85-5-5-5 ingot** | | |
| No. 115 | 15.00* | 16.50 |
| No. 120 | 14.50* | 16.00 |
| No. 122 | 14.00* | 15.50 |
| **80-10-10 ingot** | | |
| No. 305 | ..... | 21.00 |
| No. 315 | ..... | 18.00 |
| **88-10-2 ingot** | | |
| No. 210 | ..... | 27.50 |
| No. 215 | ..... | 24.50 |
| No. 245 | 17.50* | 19.75 |
| **Yellow ingot** | | |
| No. 405 | 12.75* | 14.25 |
| **Manganese bronze** | | |
| No. 421 | ..... | 19.00 |

*F.o.b. Philadelphia.

### Aluminum Ingot

*(Cents per lb, lots of 30,000 lb)*

| | |
|---|---|
| **95-5 aluminum-silicon alloys** | |
| 0.30 copper, max. | 18.75-19.00 |
| 0.60 copper, max. | 18.50-18.75 |
| Piston alloys (No. 122 type) | 16.75 |
| No. 12 alum. (No. 2 grade) | 15.50-16.00 |
| 108 alloy | 16.25-16.75 |
| 195 alloy | 17.25-17.50 |
| 13 alloy | 18.50-18.75 |
| AXS-679 | 16.50-16.75 |
| 5% Ti, Aluminum, f.o.b., Eddystone, Pa. | |
| Low copper | 31.00 |
| 2% copper | 28.00 |

### Steel deoxidizing aluminum, notch-bar granulated or shot

| | |
|---|---|
| Grade 1—95-97½% | 16.75-17.25 |
| Grade 2—92-95% | 15.75-16.25 |
| Grade 3—90-92% | 14.75-15.25 |
| Grade 4—85-90% | 13.75-14.25 |

## Electroplating Supplies

### Anodes

*(Cents per lb, freight allowed, in 500 lb lots)*

| | |
|---|---|
| Copper | |
| Cast, oval, 15 in. or longer | 34⅝ |
| Electrodeposited | 28⅞ |
| Rolled, oval, straight, delivered | 31.46 |
| Ball anodes | 32⅞ |
| Brass, 80-20 | |
| Cast, oval, 15 in. or longer | 30⅝ |
| Zinc, oval, 99.886, f.o.b. Detroit | 17¼ |
| Ball anodes | 16¼ |
| Nickel 99 pct plus | |
| Cast | 59.00 |
| Rolled, depolarized | 60.00 |
| Cadmium | $2.15 |
| Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn. | 79 |

### Chemicals

*(Cents per lb, f.o.b. shipping point)*

| | |
|---|---|
| Copper cyanide, 100 lb drum | 45.00 |
| Copper sulfate, 99.5 crystals, bbl | 11.10 |
| Nickel salts, single or double, 4-100 lb bags, frt allowed | 18.00 |
| Nickel chloride, 300 lb bbl | 24.50 |
| Silver cyanide, 100 oz lots, per oz. | 59 |
| Sodium cyanide, 96 pct domestic 200 lb drums | 19.25 |
| Zinc sulfate, crystals, 22.5 pct, bags | 6.75 |
| Zinc sulfate, 25 pct, flakes, bbl | 7.75 |

## Scrap Metals

### Brass Mill Scrap

*(Cents per pound; add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)*

| | Heavy | Turnings |
|---|---|---|
| Copper | 14⅝ | 13⅞ |
| Yellow brass | 12 | 11 |
| Red brass | 13¼ | 12½ |
| Commercial bronze | 13½ | 12¾ |
| Manganese bronze | 11⅝ | 10⅞ |
| Leaded brass rod ends | 11¾ | .... |

### Custom Smelters' Scrap

*(Cents per pound, carload lots, delivered to refinery)*

| | |
|---|---|
| No. 1 copper wire | 13.50 |
| No. 2 copper wire | 12.50 |
| Light copper | 11.50 |
| Refinery brass | 11.25* |
| Radiators | 8.50 |

*Dry copper content.

### Ingot Makers' Scrap

*(Cents per pound, carload lots, delivered to producer)*

| | |
|---|---|
| No. 1 copper wire | 13.50 |
| No. 2 copper wire | 12.50 |
| Light copper | 11.50 |
| No. 1 composition | 10.75 |
| No. 1 comp. turnings | 10.25 |
| Rolled brass | 8.75 |
| Brass pipe | 9.25 |
| Radiators | 8.75 |
| Heavy yellow brass | 8.50 |
| ***Aluminum*** | |
| Mixed old cast | 10.00-10.50 |
| Mixed old clips | 10.00-10.50 |
| Mixed turnings, dry | 8.50- 9.00 |
| Pots and pans | 10.00-10.50 |
| Low copper | 11.50 |

### Dealers' Scrap

*(Dealers' buying prices, f.o.b. New York in cents per pound)*

| | |
|---|---|
| **Copper and Brass** | |
| No. 1 heavy copper and wire | 11¾—12 |
| No. 2 heavy copper and wire | 10¾—11 |
| Light copper | 9¾—10 |
| Auto radiators (unsweated) | 7¼— 7½ |
| No. 1 composition | 9 — 9¼ |
| No. 1 composition turnings | 8½— 8¾ |
| Clean red car boxes | 7½— 7¾ |
| Cocks and faucets | 7½— 7¾ |
| Mixed heavy yellow brass | 6 — 6¼ |
| Old rolled brass | 7¼— 7¾ |
| Brass pipe | 8¼— 8½ |
| New soft brass clippings | 10 —10½ |
| Brass rod ends | 7¾— 8 |
| No. 1 brass rod turnings | 7½— 7¾ |
| **Aluminum** | |
| Alum. pistons and struts | 5 — 5½ |
| Aluminum crankcases | 7 — 8 |
| 2S aluminum clippings | 10½—11 |
| Old sheet and utensils | 7 — 8 |
| Borings and turnings | 4 |
| Misc. cast aluminum | 7 — 8 |
| Dural clips (24S) | 7 — 8 |
| **Zinc** | |
| New zinc clippings | 5½— 6 |
| Old zinc | 3½— 4 |
| Zinc routings | 2¼— 2¾ |
| Old die cast scrap | 2½— 2¾ |
| **Nickel and Monel** | |
| Pure nickel clippings | 21 —23 |
| Clean nickel turnings | 14 —15 |
| Nickel anodes | 20 —22 |
| Nickel rod ends | 20 —22 |
| New Monel clippings | 12 —14 |
| Clean Monel turnings | 8 — 9 |
| Old sheet Monel | 10 —12 |
| Old Monel castings | 9 —10 |
| Inconel clippings | 11 —13 |
| Nickel silver clippings, mixed | 8 —10 |
| Nickel silver turnings, mixed | 6 — 7 |
| **Lead** | |
| Soft scrap, lead | 9½—10 |
| Battery plates (dry) | 4 — 4½ |
| **Magnesium** | |
| Segregated solids | 9 —10 |
| Castings | 5½— 6½ |
| **Miscellaneous** | |
| Block tin | 70 —72 |
| No. 1 pewter | 42 —45 |
| No. 1 auto babbitt | 38 —40 |
| Mixed common babbitt | 10 —10¼ |
| Solder joints | 12 —12½ |
| Siphon tops | 44 —46 |
| Small foundry type | 14¼—14½ |
| Monotype | 12½—13 |
| Lino. and stereotype | 12 —12½ |
| Electrotype | 9½—10 |
| New type shell cuttings | 9 |
| Hand picked type shells | 4 — 4½ |
| Lino. and stereo. dross | 5 — 5¼ |
| Electro. dross | 2¾— 3 |

MARKETS—PRICES—TRENDS

# SCRAP
## *Iron & Steel*

## Prices Firm With Some Large Purchases

In most major market areas the market trend remained strong despite the continuation of the steel strike. Large tonnages of scrap were purchased at Buffalo within the prevailing quotations and at St. Louis the buying of 50,000 tons of material raised the price of No. 2 steel and No. 2 bundles by $1.00. Railroad lists closed strong and there were no bargains. Material is considered to be in strong hands and for the present no bargain prices can be expected. Brokers and dealers are reportedly trying to do some speculative buying in the hopes of making a quick profit when the steel strike ends. Prices generally are firm, and where a strong demand existed higher quotations are the rule. The top quotation of No. 1 steel was off $3.00 in Detroit and off $1.00 in Philadelphia. The Philadelphia decline resulted in a drop of 34¢ per gross ton in THE IRON AGE scrap composite to $26.58.

**PITTSBURGH**—There was no market activity here and the full effects of the steel strike was being felt by the trade. Railroad lists closed strong and there were no bargains to be had. The undertone of the market is firm and prices remain unchanged from last week.

**CHICAGO**—The market still shows strength at the lower prices quoted last week. Brokers are buying and storing in many cases. In one case a large mill is laying down turnings to be crushed and stored. Most other movements to the struck mills have stopped and the mills still running are buying carefully. Railroad scrap prices held up surprisingly well. Strength will be measured from now on by the collective opinions of how long the strike will last.

**PHILADELPHIA**—There was no new buying of steel grades in this district with the majority of consuming plants closed down by the strike. Although dealer sentiment has not softened appreciably, the market is quoted $1.00 lower on an appraisal basis. Turnings grades are quoted 50¢ lower. Cast grades have been sold at the lower prices quoted. Chemical borings are being bought at $1.00 higher.

**NEW YORK**—Demand for material here was practically nonexistant as the steel strike entered its second week. There was some buying of scrap, but mainly distressed material at prices below current quotations. The cast market is somewhat weaker and what activity there is consists of old business. The market is marking time and most prices remain unchanged pending settlement of the steel strike.

**DETROIT**—In the absence of buying by either mills or brokers, the trend in scrap prices is best evidenced by dealer prices to peddlers and brokers' bids on industrial scrap. Dealers, it is reliably reported, have dropped their prices to collectors a minimum of $5.00 and the prices brought by industrial tonnages have sagged $4.00 and upward from the levels prevailing prior to the steel strike. This week's prices down $3.00 for most grades reflect the present weakness in the steel market. Meanwhile, cast grades are strong, reflecting in part the fact that foundry charges of cast may have to be increased as pig iron supplies are cut off by the strike.

**CLEVELAND**—Despite the steel strike, the scrap market here and in the Valley was very strong this week. Mills operating in nearby districts are trying to pick up bargains as are many yard operators. Railroad lists that were not withdrawn closed unexpectedly strong and other material that would normally be distressed under present circumstances went for big money. Some tonnage is being laid down, but nobody seems to know whether it is for brokers or for mill account. On the basis of trading among brokers and dealers, prices quoted are nominal. However, production of scrap has started to taper off. In the absence of mill buying, it is being predicted freely here that if the steel strike is not settled within 2 weeks, the market will break.

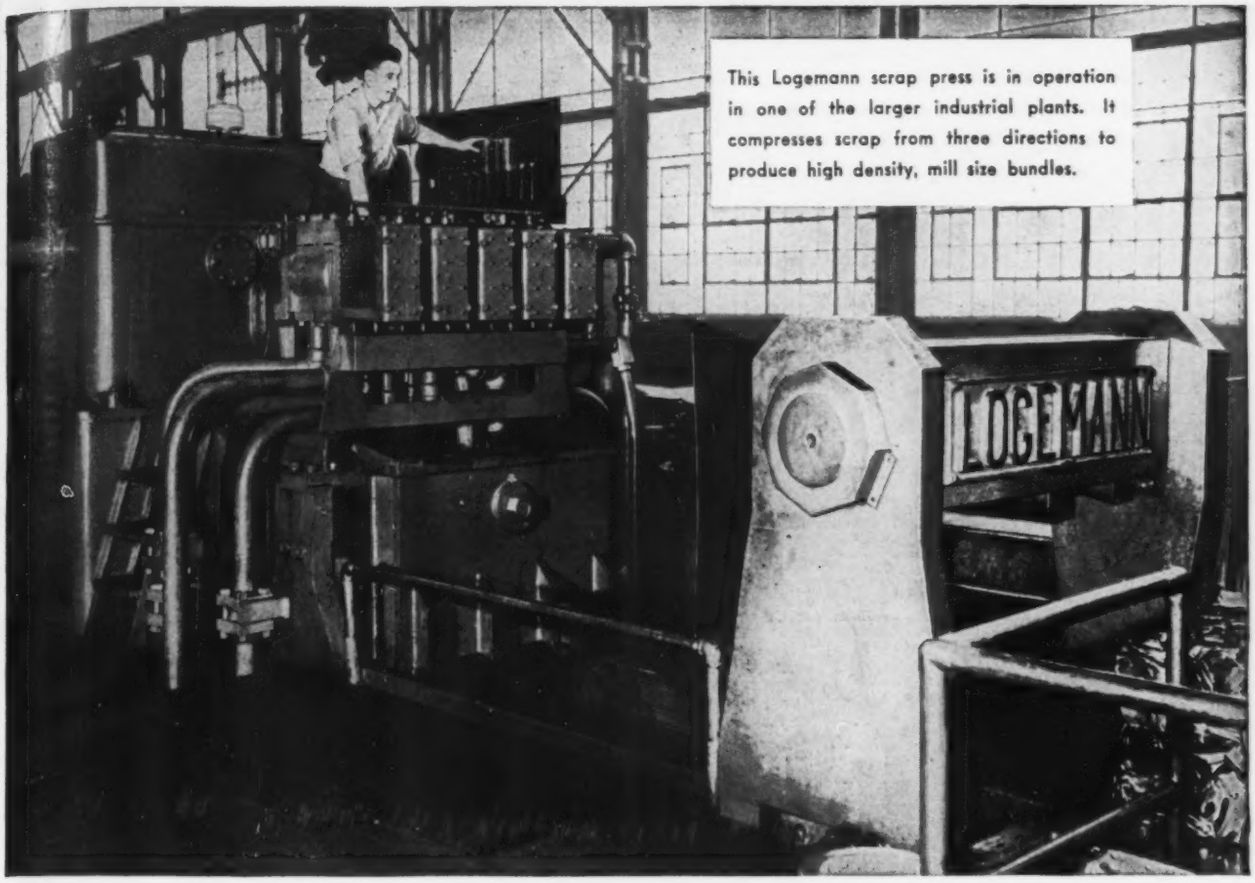
**BOSTON**—Labor news has, of course, affected the scrap market and activity is far below normal. Brokers have a small amount of orders for non-struck plants. No. 1 steel holds at $17.00 to $18.00, which is the top price of the current move. Other items show no change. Cast, which is not hit as hard as scrap by the strikes, shows a little activity.

**BUFFALO**—Activity in the scrap market is confined to dealers loading cars for delivery at the end of the steel strike. Dealers report that the market has lost none of its prestrike strength when approximately 25,000 tons sold within prevailing ranges. Dealers are also paying in accordance with quoted prices on material moving into their yards. Hopes are held for an early break in the steel strike to avoid rail demurrage charges.

**CINCINNATI**—While two major consumers in this district are operating, there has been no substantial change in the market here. Brokers and dealers are hanging on to their tonnages and showing no inclination to unload on a bargain basis. Some price concessions are being made on production scrap and blast furnace grades are moving. Foundries are buying small tonnages as the foundry grades continue to show strength. Trade confidence in the strength of the market is indicated by the willingness of brokers to pick up anything that looks like a bargain.

**BIRMINGHAM**—The scrap market in this area is hard hit by the steel strike. No orders are being placed for openhearth grades and there is little demand for other types of material, although prices have advanced for No. 1 cupola cast and rerolling rails.

**ST. LOUIS**—Two steel mills came into the market with the purchase of an estimated 50,000 tons of No. 2 heavy melting steel and bundled sheets, of which one-fourth was the latter paying $26.00 per gross ton at the plants. Thus brokers and dealers who had been buying speculatively while the mills were out of the market profited. The shipments are to be made over the next 30 to 45 days. Following purchases the market was flooded with tenders of scrap from other markets. But the mills here have now stopped buying.




This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

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•

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**LOGEMANN BROTHERS COMPANY**
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# Scrap IRON & STEEL Prices

**Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.**

## Pittsburgh

| | |
|---|---|
| No. 1 hvy. melting | $29.50 to $30.00 |
| No. 2 hvy. melting | 27.50 to 28.00 |
| No. 1 bundles | 29.50 to 30.00 |
| No. 2 bundles | 23.00 to 23.50 |
| Machine shop turn. | 19.50 to 20.00 |
| Mixed bor. and ms. turn. | 19.50 to 20.00 |
| Shoveling turnings | 21.00 to 22.00 |
| Cast iron borings | 20.00 to 21.00 |
| Low phos. plate | 31.50 to 32.00 |
| Heavy turnings | 24.00 to 25.00 |
| No. 1 RR. hvy. melting | 31.50 to 32.00 |
| Scrap rails, random lgth. | 34.00 to 35.00 |
| Rails 2 ft and under | 38.00 to 39.00 |
| RR. steel wheels | 33.00 to 34.00 |
| RR. spring steel | 33.00 to 34.00 |
| RR. couplers and knuckles | 33.00 to 34.00 |
| No. 1 machinery cast | 39.00 to 40.00 |
| Mixed yard cast | 35.50 to 36.50 |
| Heavy breakable cast. | 29.00 to 30.00 |
| Malleable | 32.00 to 33.00 |

## Chicago

| | |
|---|---|
| No. 1 hvy. melting | $25.00 to $26.00 |
| No. 2 hvy. melting | 23.00 to 24.00 |
| No. 1 factory bundles | 25.00 to 26.00 |
| No. 1 dealers' bundles | 21.00 to 22.00 |
| No. 2 dealers' bundles | 19.00 to 20.00 |
| Machine shop turn. | 17.00 to 18.00 |
| Mixed bor. and turn. | 16.00 to 17.00 |
| Shoveling turnings | 18.00 to 19.00 |
| Cast iron borings | 17.00 to 18.00 |
| Low phos. forge crops | 33.00 to 34.00 |
| Low phos. plate | 30.00 to 31.00 |
| No. 1 RR. hvy. melting | 29.00 to 30.00 |
| Scrap rails, random lgth. | 36.50 to 37.50 |
| Rerolling rails | 41.50 to 42.50 |
| Rails 2 ft and under | 40.00 to 41.00 |
| Locomotive tires, cut | 36.00 to 37.00 |
| Cut bolsters & side frames | 33.00 to 35.00 |
| Angles and splice bars | 35.00 to 36.00 |
| RR. steel car axles | 43.00 to 44.00 |
| No. 3 steel wheels | 31.00 to 32.00 |
| RR. couples and knuckles | 34.00 to 35.00 |
| No. 1 machinery cast | 40.00 to 41.00 |
| No. 1 agricul. cast | 39.00 to 40.00 |
| Heavy breakable cast | 32.00 to 34.00 |
| RR. grate bars | 30.00 to 31.00 |
| Cast iron brake shoes | 30.00 to 31.00 |
| Cast iron car wheels | 32.00 to 34.00 |
| Malleable | 36.00 to 37.00 |

## Philadelphia

| | |
|---|---|
| No. 1 hvy. melting | $24.00 to $25.00 |
| No. 2 hvy. melting | 23.00 to 24.00 |
| No. 1 bundles | 24.00 to 25.00 |
| No. 2 bundles | 22.00 to 23.00 |
| Machine shop turn. | 16.00 to 17.00 |
| Mixed bor. and turn. | 16.00 to 17.00 |
| Shoveling turnings | 16.50 to 17.50 |
| Low phos. punchings, plate | 26.00 to 26.50 |
| Low phos. 5 ft and under | 25.00 to 26.00 |
| Low phos. bundles | 24.50 to 25.00 |
| Hvy. axle forge turn. | 24.00 to 25.00 |
| Clean cast chem. borings | 24.00 to 25.00 |
| R.R. steel wheels | 26.00 to 28.00 |
| RR. spring steel | 26.00 to 28.00 |
| No. 1 machinery cast | 35.00 to 36.00 |
| Mixed yard cast | 32.00 to 33.00 |
| Heavy breakable cast | 32.00 to 33.00 |
| Cast iron carwheels | 34.00 to 35.00 |
| Malleable | 34.00 to 35.00 |

## Cleveland

| | |
|---|---|
| No. 1 hvy. melting | $26.50 to $27.00 |
| No. 2 hvy. melting | 24.00 to 24.50 |
| No. 1 bushelings | 26.50 to 27.00 |
| No. 1 bundles | 26.50 to 27.00 |
| No. 2 bundles | 19.50 to 20.00 |
| Machine shop turn. | 16.00 to 16.50 |
| Mixed bor. and turn. | 17.50 to 18.00 |
| Shoveling turnings | 17.50 to 18.00 |
| Cast iron borings | 17.50 to 18.00 |
| Low phos. 2 ft and under | 28.00 to 28.50 |
| Steel axle turn. | 26.50 to 27.00 |
| Drop forge flashings | 26.50 to 27.00 |
| No. 1 RR. hvy. melting | 32.00 to 33.00 |
| Rails 3 ft and under | 40.00 to 41.00 |
| Rails 18 in. and under | 41.00 to 42.00 |
| No. 1 machinery cast | 43.00 to 44.00 |
| RR. cast | 43.00 to 44.00 |
| RR. grate bars | 32.00 to 33.00 |
| Stove plate | 36.00 to 37.00 |
| Malleable | 38.00 to 39.00 |

## Youngstown

| | |
|---|---|
| No. 1 hvy. melting | $30.50 to $31.00 |
| No. 2 hvy. melting | 28.00 to 28.50 |
| No. 1 bundles | 30.50 to 31.00 |
| No. 2 bundles | $22.00 to $22.50 |
| Machine shop turn. | 16.50 to 17.00 |
| Shoveling turnings | 19.50 to 20.00 |
| Cast iron borings | 19.50 to 20.00 |
| Low phos. plate | 31.50 to 32.00 |

## Buffalo

| | |
|---|---|
| No. 1 hvy. melting | $28.00 to $28.50 |
| No. 2 hvy. melting | 25.50 to 26.00 |
| No. 1 busheling | 25.50 to 26.00 |
| No. 1 bundles | 27.00 to 27.50 |
| No. 2 bundles | 24.00 to 24.50 |
| Machine shop turn. | 19.50 to 20.00 |
| Mixed bor. and turn. | 19.50 to 20.00 |
| Shoveling turnings | 21.50 to 22.00 |
| Cast iron borings | 19.50 to 20.00 |
| Low phos. plate | 28.50 to 29.00 |
| Scrap rails, random lgth. | 31.50 to 32.00 |
| Rails 2 ft and under | 36.50 to 37.00 |
| RR. steel wheels | 32.00 to 33.00 |
| RR. spring steel | 32.00 to 33.00 |
| RR. couplers and knuckles | 32.00 to 33.00 |
| No. 1 cupola cast | 38.00 to 39.00 |
| Mixed yard cast | 36.50 to 37.00 |
| Stove plate | 36.50 to 37.00 |
| Small indus. malleable | 24.00 to 25.00 |

## Birmingham

| | |
|---|---|
| No. 1 hvy. melting | $25.00 |
| No. 2 hvy. melting | 24.00 |
| No. 2 bundles | 22.00 |
| No. 1 busheling | 24.00 |
| Machine shop turn. | $16.00 to 17.00 |
| Shoveling turnings | 19.00 |
| Cast iron borings | 18.00 |
| Bar crops and plate | 29.00 to 30.00 |
| Structural and plate | 29.00 to 30.00 |
| No. 1 RR. hvy. melt. | 28.00 to 28.50 |
| Scrap rails, random lgth. | 29.00 to 30.00 |
| Rerolling rails | 35.00 to 36.75 |
| Rails 2 ft and under | 34.00 to 35.00 |
| Angles & splice bars | 32.00 to 33.00 |
| Std. steel axles | 28.00 to 29.00 |
| No. 1 cupola cast | 34.00 to 35.00 |
| Stove plate | 28.00 |
| Cast iron carwheels | 23.00 to 24.00 |

## St. Louis

| | |
|---|---|
| No. 1 hvy. melting | $27.00 to $28.00 |
| No. 2 hvy. melting | 25.00 to 26.00 |
| No. 2 bundled sheets | 25.00 to 26.00 |
| Machine shop turn. | 19.00 to 20.00 |
| Shoveling turnings | 19.00 to 20.00 |
| Rails, random lengths | 31.00 to 32.00 |
| Rails 3 ft and under | 33.00 to 34.00 |
| Locomotive tires, uncut | 27.00 to 28.00 |
| Angles and splice bars | 33.00 to 34.00 |
| Std. steel car axles | 35.00 to 37.00 |
| RR. spring steel | 29.00 to 30.00 |
| No. 1 machinery cast | 36.00 to 38.00 |
| Hvy. breakable cast. | 31.00 to 32.00 |
| Cast iron brake shoes | 31.00 to 32.00 |
| Stove plate | 33.00 to 35.00 |
| Cast iron car wheels | 34.00 to 35.00 |
| Malleable | 30.00 to 32.00 |

## New York

**Brokers' buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $18.50 to $19.00 |
| No. 2 hvy. melting | 17.00 to 18.00 |
| No. 2 bundles | 15.00 to 16.00 |
| Machine shop turn. | 10.00 to 11.00 |
| Mixed bor. and turn. | 10.00 to 11.00 |
| Shoveling turnings | 11.00 to 12.00 |
| Clean cast chem. bor. | 21.00 to 22.00 |
| No. 1 machinery cast | 30.00 to 32.00 |
| Mixed yard cast | 29.00 to 31.00 |
| Charging box cast | 24.00 to 26.00 |
| Heavy breakable cast | 24.00 to 26.00 |
| Unstrp. motor blocks | 25.00 to 26.00 |

## Boston

**Brokers' buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $17.00 to 18.00 |
| No. 2 hvy. melting | 15.00 to 16.00 |
| No. 1 bundles | 17.00 to 18.00 |
| No. 2 bundles | $15.00 to $16.00 |
| Machine shop turn. | 12.50 to 13.00 |
| Mixed bor. and turn. | 10.00 to 10.50 |
| Shoveling turnings | 14.00 to 14.50 |
| No. 2 busheling | 14.00 to 14.50 |
| Clean cast chem. borings | 16.00 to 17.00 |
| No. 1 machinery cast | 31.00 to 33.00 |
| No. 2 machinery cast | 27.00 to 28.00 |
| Heavy breakable cast | 20.00 to 21.00 |
| Stove plate | 24.00 to 25.00 |

## Detroit

**Brokers' buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $17.00 to $18.00 |
| No. 2 hvy. melting | 15.00 to 16.00 |
| No. 1 bundles | 19.00 to 20.00 |
| New busheling | 17.00 to 18.00 |
| Flashings | 17.00 to 18.00 |
| Machine shop turn. | 11.00 to 12.00 |
| Mixed bor. and turn. | 14.00 to 15.00 |
| Shoveling turnings | 13.00 to 14.00 |
| Cast iron borings | 13.00 to 14.00 |
| Low phos. plate | 17.00 to 18.00 |
| No. 1 cupola cast | 33.00 to 34.00 |
| Heavy breakable cast | 27.00 to 29.00 |
| Stove plate | 26.00 to 27.00 |
| Automotive cast | 33.00 to 34.00 |

## Cincinnati

**Per gross ton, f.o.b. cars:**

| | |
|---|---|
| No. 1 hvy. melting | $25.50 to $26.00 |
| No. 2 hvy. melting | 21.50 to 22.00 |
| No. 1 bundles | 25.50 to 26.00 |
| No. 2 bundles | 19.50 to 20.00 |
| Machine shop turn. | 13.50 to 13.00 |
| Mixed bor. and turn. | 13.50 to 13.00 |
| Shovelings turnings | 15.50 to 16.00 |
| Cast iron borings | 14.50 to 15.00 |
| Low phos. 18 in. under | 34.00 to 35.00 |
| Rails, random lengths | 34.00 to 35.00 |
| Rails, 18 in. and under | 44.00 to 45.00 |
| No. 1 cupola cast | 40.00 to 41.00 |
| Hvy. breakable cast | 34.00 to 35.00 |
| Drop broken cast | 43.00 to 44.00 |

## San Francisco

| | |
|---|---|
| No. 1 hvy. melting | $20.00 |
| No. 2 hvy. melting | 18.00 |
| No. 1 bundles | 16.00 |
| No. 2 bundles | 16.00 |
| No. 3 bundles | 13.00 |
| Machine shop turn | 9.00 |
| Elec. fur 1 ft and under | 28.00 |
| No. 1 RR. hvy. melting | 17.00 |
| Scrap rails, random lgth. | 17.00 |
| No. 1 cupola cast. | 30.00 |

## Los Angeles

| | |
|---|---|
| No. 1 hvy. melting | $20.00 |
| No. 2 hvy. melting | 18.00 |
| No. 1 bundles | 16.00 |
| No. 2 bundles | 16.00 |
| No. 3 bundles | 13.00 |
| Mach. shop turn. | 12.00 |
| Elec. fur. 1 ft and under | 30.00 |
| No. 1 RR. hvy. melting | 20.00 |
| No. 1 cupola cast. | $36.00 to 40.00 |

## Seattle

| | |
|---|---|
| No. 1 hvy. melting | $16.00 |
| No. 2 hvy. melting | 16.00 |
| No. 1 bundles | 15.00 |
| No. 2 bundles | 15.00 |
| No. 3 bundles | 12.00 |
| Elec. fur. 1 ft and under | 21.00 |
| RR. hvy. melting | 19.00 |
| No. 1 cupola cast | $20.00 to 27.00 |
| Heavy breakable cast | 20.00 |

## Hamilton, Ont.

**Cast grades f.o.b. shipping point:**

| | |
|---|---|
| No. 1 hvy. melting | $20.00 |
| No. 1 bundles | 20.00 |
| No. 2 bundles | 19.50 |
| Mechanical bundles | 18.00 |
| Mixed steel scrap | 16.00 |
| Mixed bor. and turn. | 14.00 |
| Rails, remelting | 20.00 |
| Rails, rerolling | 23.00 |
| Bushelings | 14.50 |
| Bush., new fact. prep'd. | 18.00 |
| Bush., new fact. unprep'd. | 13.00 |
| Short steel turnings | 14.00 |
| Cast scrap | $33.00 to 35.00 |

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## LEADERS IN IRON AND STEEL SCRAP SINCE 1889

# Comparison of Prices

**Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.**

| Flat-Rolled Steel: (cents per pound) | Oct. 11, 1949 | Oct. 4, 1949 | Sept. 13, 1949 | Oct. 12, 1948 |
|---|---|---|---|---|
| Hot-rolled sheets | 3.25 | 3.25 | 3.25 | 3.26 |
| Cold-rolled sheets | 4.00 | 4.00 | 4.00 | 4.00 |
| Galvanized sheets (10 ga) | 4.40 | 4.40 | 4.40 | 4.40 |
| Hot-rolled strip | 3.25 | 3.25 | 3.25 | 3.265 |
| Cold-rolled strip | 4.038 | 4.038 | 4.038 | 4.063 |
| Plates | 3.40 | 3.40 | 3.40 | 3.42 |
| Plates wrought iron | 7.85 | 7.85 | 7.85 | 7.85 |
| Stains C-R strip (No. 302) | 33.00 | 33.00 | 33.00 | 33.25 |
| **Tin and Terneplate:** (dollars per base box) | | | | |
| Tinplate (1.50 lb) cokes | $7.75 | $7.75 | $7.75 | $6.80 |
| Tinplate, electro (0.50 lb) | 6.70 | 6.70 | 6.70 | 6.00 |
| Special coated mfg. ternes | 6.65 | 6.65 | 6.65 | 5.90 |
| **Bars and Shapes:** (cents per pound) | | | | |
| Merchant bars | 3.35 | 3.35 | 3.35 | 3.37 |
| Cold-finished bars | 3.995 | 3.995 | 3.995 | 3.995 |
| Alloy bars | 3.75 | 3.75 | 3.75 | 3.75 |
| Structural shapes | 3.25 | 3.25 | 3.25 | 3.25 |
| Stainless bars (No. 302) | 28.50 | 28.50 | 28.50 | 28.50 |
| Wrought iron bars | 9.50 | 9.50 | 9.50 | 9.50 |
| **Wire:** (cents per pound) | | | | |
| Bright wire | 4.15 | 4.15 | 4.15 | 4.256 |
| **Rails:** (dollars per 100 lb) | | | | |
| Heavy rails | $3.20 | $3.20 | $3.20 | $3.20 |
| Light rails | 3.55 | 3.55 | 3.55 | 3.55 |
| **Semifinished Steel:** (dollars per net ton) | | | | |
| Rerolling billets | $52.00 | $52.00 | $52.00 | $52.00 |
| Slabs, rerolling | 52.00 | 52.00 | 52.00 | 52.00 |
| Forging billets | 61.00 | 61.00 | 61.00 | 61.00 |
| Alloy blooms, billets, slabs | 63.00 | 63.00 | 63.00 | 63.00 |
| **Wire rod and Skelp:** (cents per pound) | | | | |
| Wire rods | 3.40 | 3.40 | 3.40 | 3.619 |
| Skelp | 3.25 | 3.25 | 3.25 | 3.25 |

**Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.**

| Pig Iron: (per gross ton) | Oct. 11, 1949 | Oct. 4, 1949 | Sept. 13, 1949 | Oct. 12, 1948 |
|---|---|---|---|---|
| No. 2, foundry, Phila. | $50.42 | $50.42 | $50.42 | $51.56 |
| No. 2, Valley furnace | 46.50 | 46.50 | 46.50 | 46.50 |
| No. 2, Southern Cin'ti | 46.08 | 46.08 | 46.08 | 49.47 |
| No. 2, Birmingham | 39.38 | 39.38 | 39.38 | 43.38 |
| No. 2, foundry, Chicago† | 46.50 | 46.50 | 46.50 | 46.50 |
| Basic del'd Philadelphia | 49.92 | 49.92 | 49.92 | 50.76 |
| Basic, Valley furnace | 46.00 | 46.00 | 46.00 | 46.00 |
| Malleable, Chicago† | 46.50 | 46.50 | 46.50 | 46.50 |
| Malleable, Valley | 46.50 | 46.50 | 46.50 | 46.50 |
| Charcoal, Chicago | 68.56 | 68.56 | 68.56 | 73.78 |
| Ferromanganese‡ | 173.40 | 173.40 | 173.40 | 161.71 |

**†The switching charge for delivery to foundries in the Chicago district is $1 per ton.**
**‡Average of U. S. prices quoted on Ferroalloy page.**

| Scrap: (per gross ton) | | | | |
|---|---|---|---|---|
| Heavy melt'g steel, P'gh. | $29.75 | $29.75 | $28.25 | $42.75 |
| Heavy melt'g steel, Phila. | *24.50* | 25.50 | 23.50 | 45.00 |
| Heavy melt'g steel, Ch'go | 25.50 | 25.50 | 25.50 | 41.75 |
| No. 1 hy. comp. sh't Det. | *19.50* | 22.50 | 23.50 | 38.00 |
| Low phos. Young'n | 31.75 | 31.75 | 29.75 | 47.75 |
| No. 1, cast, Pittsburgh | 39.50 | 39.50 | 39.50 | 70.00 |
| No. 1, cast, Philadelphia | *35.50* | 39.00 | 37.00 | 65.50 |
| No. 1, cast, Chicago | 40.50 | 40.50 | 42.50 | 69.50 |
| **Coke: Connellsville:** (per net ton at oven) | | | | |
| Furnace coke, prompt | $14.25 | $14.25 | $14.25 | $15.00 |
| Foundry coke, prompt | 15.75 | 15.75 | 15.75 | 17.00 |
| **Nonferrous Metals:** (cents per pound to large buyers) | | | | |
| Copper, electro, Conn. | 17.625 | 17.625 | 17.625 | 23.50 |
| Copper, Lake Conn. | 17.75 | 17.75 | 17.75 | 23.625 |
| Tin, Straits, New York | 96.00 | 96.00 | $1.03 | $1.03 |
| Zinc, East St. Louis | 9.25 | 9.25 | 10.00 | 15.00 |
| Lead, St. Louis | *13.60* | 14.05 | 14.925 | 19.30 |
| Aluminum, virgin | 17.00 | 17.00 | 17.00 | 17.00 |
| Nickel electrolytic | 42.97 | 42.93 | 42.93 | 42.90 |
| Magnesium, ingot | 20.50 | 20.50 | 20.50 | 20.50 |
| Antimony, Laredo, Tex. | *32.00* | 38.50 | 38.50 | 35.00 |

# Composite Prices

**Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)**

| | Finished Steel Base Price | Pig Iron | Scrap Steel |
|---|---|---|---|
| Oct. 11, 1949 | 3.705¢ per lb. | $45.88 per gross ton | *$26.58* per gross ton |
| One week ago | 3.705¢ per lb. | 45.88 per gross ton | 26.92 per gross ton |
| One month ago | 3.705¢ per lb. | 45.88 per gross ton | 25.75 per gross ton |
| One year ago | 3.720¢ per lb. | 46.91 per gross ton | 43.16 per gross ton |

| | Finished Steel High | | | Low | | | Pig Iron High | | Pig Iron Low | | Scrap Steel High | | Scrap Steel Low | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1949 | 3.720¢ | Jan. | 1 | 3.705¢ | May | 3 | $46.82 | Jan. 4 | $45.88 | Sept. 6 | $43.00 | Jan. 1 | $19.33 | June 28 |
| 1948 | 3.721¢ | July | 27 | 3.193¢ | Jan. | 1 | 46.91 | Oct. 12 | 39.58 | Jan. 6 | 43.16 | July 27 | 39.75 | Mar. 9 |
| 1947 | 3.193¢ | July | 29 | 2.848¢ | Jan. | 1 | 37.98 | Dec. 30 | 30.14 | Jan. 7 | 42.58 | Oct. 28 | 29.50 | May 20 |
| 1946 | 2.848¢ | Dec. | 31 | 2.464¢ | Jan. | 1 | 30.14 | Dec. 10 | 25.37 | Jan. 1 | 31.17 | Dec. 24 | 19.17 | Jan. 1 |
| 1945 | 2.464¢ | May | 29 | 2.396¢ | Jan. | 1 | 25.37 | Oct. 23 | 23.61 | Jan. 2 | 19.17 | Jan. 2 | 18.92 | May 22 |
| 1944 | 2.396¢ | | | 2.396¢ | | | $23.61 | | $23.61 | | 19.17 | Jan. 11 | 15.76 | Oct. 24 |
| 1943 | 2.396¢ | | | 2.396¢ | | | 23.61 | | 23.61 | | $19.17 | | $19.17 | |
| 1942 | 2.396¢ | | | 2.396¢ | | | 23.61 | | 23.61 | | 19.17 | | 19.17 | |
| 1941 | 2.396¢ | | | 2.396¢ | | | $23.61 | Mar. 20 | $23.45 | Jan. 2 | $22.00 | Jan. 7 | $19.17 | Apr. 10 |
| 1940 | 2.30467¢ | Jan. | 2 | 2.24107¢ | Apr. | 16 | 23.45 | Dec. 23 | 22.61 | Jan. 2 | 21.83 | Dec. 30 | 16.04 | Apr. 9 |
| 1939 | 2.35367¢ | Jan. | 3 | 2.26689¢ | May | 16 | 22.61 | Sept. 19 | 20.61 | Sept. 12 | 22.50 | Oct. 3 | 14.08 | May 16 |
| 1938 | 2.58414¢ | Jan. | 4 | 2.27207¢ | Oct. | 18 | 23.25 | June 21 | 19.61 | July 6 | 15.00 | Nov. 22 | 11.00 | June 7 |
| 1937 | 2.58414¢ | Mar. | 9 | 2.32263¢ | Jan. | 4 | 23.25 | Mar. 9 | 20.25 | Feb. 16 | 21.92 | Mar. 30 | 12.67 | June 9 |
| 1936 | 2.32263¢ | Dec. | 28 | 2.05200¢ | Mar. | 10 | 19.74 | Nov. 24 | 18.73 | Aug. 11 | 17.75 | Dec. 21 | 12.67 | June 8 |
| 1935 | 2.07642¢ | Oct. | 1 | 2.06492¢ | Jan. | 8 | 18.84 | Nov. 5 | 17.83 | May 14 | 13.42 | Dec. 10 | 10.33 | Apr. 29 |
| 1934 | 2.15367¢ | Apr. | 24 | 1.95757¢ | Jan. | 2 | 17.90 | May 1 | 16.90 | Jan. 27 | 13.00 | Mar. 13 | 9.50 | Sept. 25 |
| 1933 | 1.95578¢ | Oct. | 3 | 1.75836¢ | May | 2 | 16.90 | Dec. 5 | 13.56 | Jan. 3 | 12.25 | Aug. 8 | 6.75 | Jan. 3 |
| 1932 | 1.89196¢ | July | 5 | 1.83901¢ | Mar. | 1 | 14.81 | Jan. 5 | 13.56 | Dec. 6 | 8.50 | Jan. 12 | 6.43 | July 5 |
| 1931 | 1.99626¢ | Jan. | 13 | 1.86586¢ | Dec. | 29 | 15.90 | Jan. 6 | 14.79 | Dec. 15 | 11.33 | Jan. 6 | 8.50 | Dec. 29 |
| 1929 | 2.31773¢ | May | 28 | 2.26498¢ | Oct. | 29 | 18.71 | May 14 | 18.21 | Dec. 17 | 17.58 | Jan. 29 | 14.08 | Dec. 8 |

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

# ALTER

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*Over 50 Years*

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# STEEL PRICES

Smaller numbers indicate producing companies. See key on facing page.
Base prices at producing points apply to the sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

| | Pittsburgh, Weirton | Chicago | Gary | Cleveland | Birmingham | Buffalo | Youngstown | Sparrows Point | Granite City | Middletown | Warren | Detroit | Johnstown | Seattle, S. Fr'isco, Los Angeles | Fontana |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **INGOTS** Carbon forging | $50.00 1 | | | | | | | | | | | $50.00 31 | | | |
| Alloy | $51.00 1.17 | | | | | | | | | | | $51.00 31 | | | |
| **BILLETS, BLOOMS, SLABS** Carbon, rerolling, net ton | $52.00 1 | $52.00 1 | $52.00 1 | | $52.00 11 | $52.00 3 | $52.00 13 | Conshohocken $57.00[26] | | | | | $52.00 3 | | $71.00 19 |
| Carbon forging billets, net ton | $61.00 1 | $61.00 1.4 | $61.00 1.8 | $61.00 4 | $61.00 11 | $61.00 3.4 | Geneva $61.00[16] Conshohocken $63.00[26] | | | | $61.00 25 | $61.00 31 | $61.00 3 | | 380.00 19 |
| Alloy, net ton | $63.00 1.17 | $63.00 1.4 | $63.00 1 | Conshohocken $65.00[26] | | $63.00 3.4 | $63.00 13 | Bethlehem,[3] Canton,[4,42] Massillon[4] = $63.00 | | | | $63.00 31 | $63.00 3 | | $82.00 19 |
| **PIPE SKELP** | 3.25 1.5 | | | | | | 3.25 1.4 | | | | 3.25 4 | | | | |
| **WIRE RODS** | 3.40 2.18 | 3.40 2.4.33 | 3.40 | 3.40 2 | 3.40 4.11 | | 3.40 6 | 3.50 3 | Portsmouth 3.40[20] | | Worcester 3.70[2] | | 3.40 | 4.05[24] S.F. L.A. 4.20[62] L.A. | |
| **SHEETS** Hot-rolled (18 ga. & hvr.) | 3.25 1.5.9.15 | 3.25 23 | 3.25 1.6.8 | 3.25 4.5 | 3.25 4.11 | 3.25 3 | 3.25 1.6.13 | 3.25 3 | Kokomo,[30] Ashland[7] = 3.25 | | 3.25 4 | 3.45 12 | Consh. 3.35[26] | 3.95 24 L.A. | 4.15 19 |
| Cold-rolled | 4.00[1,5] 7.9.15.63 | | 4.00 1.6.8 | 4.00 4.5 | 4.00 11 | 4.00 3 | 4.00 6 | 4.00 3 | 4.20 | 4.00 7 | 4.00 4 | 4.20 12 | | 4.95 24 S.F. | 4.90 19 |
| Galvanized (10 gage) | 4.40 1.9.15 | | 4.40 1.8 | | 4.40 4.11 | | Niles 4.40[64] | 4.40 3 | Canton 4.40[4] | | Ashland 4.40[7] | | | 5.15 24 S.F., L.A. | |
| Enameling (12 gage) | 4.40 1 | | 4.40 1.8 | 4.40 4 | | | 4.40 6 | | 4.60 22 | 4.40 7 | | 4.70 12 | | | |
| Long ternes (10 gage) | 4.80 9.15 | | 4.80 1 | | | | | | | 4.80 7 | | | | | |
| Hi Str. Low Alloy, h.r. | 4.95 1.5.9 | 4.95 1 | 4.95 1.6.8 | 4.95 4.5 | 4.95 11 | 4.95 3 | 4.95 1.6.13 | 4.95 3 | Conshohocken 4.95[26] | | 4.95 4 | 5.15 12 | | | |
| Hi Str. Low Alloy, c.r. | 6.05 1.5 | | 6.05 1.6.8 | 6.05 4.5 | | 6.05 3 | 6.05 6.13 | 6.05 3 | | | 6.05 4 | 6.25 12 | | | |
| Hi Str. Low Alloy, galv. | 6.75 1 | | | 6.75 4 | | | | 6.75 3 | Canton 6.75[4] | | | | | | |
| **STRIP** Hot-rolled | 3.25 5.7.9.28 | 3.25 23.66 | 3.25 1.6.8 | 3.25 5 | 3.25 11 | 3.25 3 | 3.25 1.6.13 | 3.25 3 | Ashland 3.25[7] | | 3.25 4 | 3.45 12.47 | Atlanta 3.40[65] | 4.00[62] S.F., L.A. 4.25[62] S. | 4.40 19 |
| Cold-rolled | 4.00 5.7.9.63 | 4.15 66 | 4.00 8 | 4.00 2.5 | | 4.00 3 | 4.00 6.13. 40.45 | 4.00 3 | New Haven 4.50[2,68] | 4.00 7 | 4.00[4,49] 4.25[49] | 4.20 12.47 4.25[13,68] | | | 4.90 19 |
| Hi Str. Low Alloy, h.r. | 4.95 5 | | 4.95 1.6.8 | 4.95 5 | 4.95 11 | 4.95 3 | 4.95 1.6.13 | 4.95 3 | | | 4.95 4 | 5.15 12 | | | |
| Hi Str. Low Alloy, c.r. | 6.05 5.9 | | | 6.05 2.5 | | 6.05 3 | 6.05 6.13 | 6.05 3 | | | 6.05 4 | 6.25 12 | | 4.00[24,62] S.F., L.A. 4.25[62] S. | 6.95 19 |
| **TINPLATE†** Cokes, 1.50 lb. base box | $7.75 1.5.9.15 | | $7.75 1.6.8 | | $7.85 11 | | | $7.85 3 | $7.95 22 | | 7.75 4 | | | 8.50 24 S.F. | |
| Electrolytic 0.25, 0.50, 0.75 lb. box | Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price | | | | | | | | | | | | | | |
| **BLACKPLATE**, 29 ga. Hollowware enameling | 5.30 1.5.15 | | 5.30 1.6.8 | | | | | 5.40 3 | 5.50 22 | | 5.30 4 | | | | |
| **BARS** Carbon Steel | 3.35 1.5.9.17 | 3.35 1.4.23 | 3.35 1.6.8 | 3.35 4 | 3.35 4.11 | 3.35 3.4 | 3.35 1.4.6 | 3.35 3 | Atlanta 3.50[65] | Canton 3.35[4] | | 3.55 12 | 3.35 3 | 4.05[62] L.A. 4.05[24] S.F., L.A. | 4.00 19 |
| Reinforcing†† | 3.35 1.5 | 3.35 4 | 3.35 1.6.8 | 3.35 4 | 3.35 4.11 | 3.35 3.4 | 3.35 1.4.6 | 3.35 3 | Atlanta 3.50[65] | Canton 3.35[4] | | | 3.35 3 | 4.10[62] S., S.F. | 4.00 19 |
| Cold-finished | 3.95[5] 4.00[2,4] 17.52.69.71 | 4.00 2.23.69. 70 | 4.00 4.73.74 | 4.00 2.61 | | 4.00 70 | 4.00 6.40.57 | | Putnam, Newark = 4.40[69] Cumberland = 3.95[72] Massillon, Canton = 4.00[4] | | | 4.30 12 | | | |
| Alloy, hot-rolled | 3.75 1.17 | 3.75 1.4.23 | 3.75 1.6.8 | | | 3.75 3.4 | 3.75 1.6 | Bethlehem,[3] Canton,[4,42] Massillon[4] = 3.75 | | | 3.75 25 | 4.05 12 | 3.75 3 | 4.80 62 L.A. | 4.75 19 |
| Alloy cold-drawn | 4.65 2.17.52.69.71 | 4.65 2.23. 69.70 | 4.65 4.73.74 | 4.65 2.61 | | 4.65 3.70 | 4.65 6.57 | | Massillon = 4.65[4] Bethlehem = 4.65[3] | | 4.65 25 | Canton = 4.65[4,42] Newark,[69] Worcester[2] = 4.95 | | | |
| Hi Str. Low Alloy, h.r. | 5.10 1.5 | | 5.10 1.6.8 | 5.10 4 | 5.10 11 | 5.10 3 | 5.10 1.6 | Bethlehem = 5.10[3] | | | | 5.30 12 | 5.10 3 | | |
| **PLATE** Carbon steel | 3.40 1.5 | 3.40 1 | 3.40 1.6.8 | 3.40 4 | 3.40[4,11] Conshohocken = 3.50[26] | 3.40[31] | 3.40[13] | 3.40[3] Geneva = 3.40[16] | Coatesville = 3.50[21] Claymont = 3.50[29] Harrisburg = 3.75[35] | | | 3.65 12 | 3.40 3 | 4.30 62 S. | 4.00 19 |
| Floor plates | 4.55 1 | 4.55 1 | 4.55 8 | 4.55 5 | | | | Conshohocken,[26] Harrisburg[35] = 4.55 | | | | | | | |
| Alloy | 4.40 1 | 4.40 1 | 4.40 1 | Conshohocken = 4.40[26] | | | 4.40 13 | 4.40 3 | Coatesville = 4.50[21] | | | | 4.40 3 | | |
| Hi Str. Low Alloy | 5.20 1.5 | 5.20 1 | 5.20 1.8 | 5.10 4.5 | 5.20 11 | | 5.20 6 | 5.20 3 | Conshohocken = 5.20[26] Geneva = 5.20[16] | | | 5.45 12 | 5.20 3 | | |
| **SHAPES**, Structural | 3.25 1.5.9 | 3.25 1.23 | 3.25 1.6.8 | | 3.25 11 | 3.30 3 | Bethlehem = 3.30,[3] Geneva = 3.25[16] Minnequa, Colo. = 3.75[14] | | | | | | 3.30 3 | 3.80[62] S.F. 3.85[62] L.A. | 3.80 19 |
| Hi Str. Low Alloy | 4.95 1.5 | 4.95 1 | 4.95 1.6.8 | | 4.95 11 | 5.05 3 | 4.95 6 | | Bethlehem = 5.05[3] | | | | 5.05 3 | 3.90[62] S. 3.95[24] L.A. | |
| **MANUFACTURERS' WIRE** Bright | 4.15 2.5.15 | 4.15[4,33] 2.34 | | 4.15 2.77 | 4.15 4.11 | Portsmouth 4.15[20] | 4.15 6 | 4.25 3 | | Duluth = 4.15[2] Worcester = 4.45[2] Pueblo = 4.50[14] | | | 4.15 3 | 5.10[24] S.F. 5.10[62] L.A. 5.10[24] L.A. | |
| **PILING**, Steel sheet | 4.05 1.9 | 4.05 1 | | | | 4.05 3 | | | | | | | | | |

## STAINLESS STEELS

**Base prices, in cents per pound, f.o.b. producing point**

| Product | 301 | 302 | 303 | 304 | 316 | 321 | 347 | 410 | 416 | 430 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ingots, rerolling | 12.75 | 13.50 | 15.00 | 14.50 | 22.75 | 18.25 | 20.00 | 11.25 | 13.75 | 11.50 |
| Slabs, billets, rerolling | 17.00 | 18.25 | 20.25 | 19.25 | 30.25 | 24.50 | 26.75 | 15.00 | 18.50 | 15.25 |
| Forg. discs, die blocks, rings | 30.50 | 30.50 | 33.00 | 32.00 | 49.00 | 36.50 | 41.00 | 24.50 | 25.00 | 25.00 |
| Billets, forging | 24.25 | 24.25 | 26.25 | 25.50 | 39.00 | 29.00 | 32.75 | 19.50 | 20.00 | 20.00 |
| Bars, wire, structurals | 28.50 | 28.50 | 31.00 | 30.00 | 46.00 | 34.00 | 38.50 | 23.00 | 23.50 | 23.50 |
| Plates | 32.00 | 32.00 | 34.00 | 34.00 | 50.50 | 39.50 | 44.00 | 26.00 | 26.50-27.00 | 26.50 |
| Sheets | 37.50 | 37.50 | 39.50 | 39.50 | 53.00 | 45.50 | 50.00 | 33.00 | 33.50 | 35.50 |
| Strip, hot-rolled | 24.25 | 25.75 | 30.00 | 27.75 | 46.00 | 34.50 | 38.75 | 21.25 | 28.00 | 21.75 |
| Strip, cold-rolled | 30.50 | 33.00 | 36.50 | 35.00 | 55.00 | 44.50 | 48.50 | 27.00 | 33.50 | 27.50 |

*Numbers correspond to producers. See Key below.*

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Lockport, N. Y., 46.

*Strip:* Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 49; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

*Bars:* Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1, 67; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill. 2; Lockport, N. Y., 46; Canton, Ohio, 42.

*Wire:* Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Chicago, 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7.

*Structurals:* Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

*Plates:* Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

*Forged discs, die blocks and rings:* Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

*Forging billets:* Midland, Pa, 17; Baltimore, 7; Washington, Pa., 39; Mckeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago 1.

## KEY TO STEEL PRODUCERS

### With Home Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R.R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Co., Inc., Oakland, Calif.
20 Portsmouth Steel Corp., Portsmouth, Ohio
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Midvale Co., Philadelphia
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 American Chain & Cable Co., Inc., New York
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 A. M. Byers Co., Pittsburgh
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Latrobe Electric Steel Co., Latrobe, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 Vanadium-Alloys Steel Co., Latrobe, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Indianapolis
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forgings Corp., Chicago
80 Driver Harris Co., Harrison, N. J.

**Notes to Steel Price Table:**

†Special coated mfg ternes, deduct $1.10 from 1.50-lb coke base box price. Canmaking quality blackplate, 55 to 128-lb, deduct $2.00 from 1.50-lb coke base box.

‡Straight lengths only from producer to fabricator.

## PIPE AND TUBING

*Base discounts, f.o.b. mills*
*Base price, about $200.00 per net ton*

### Standard, Threaded and Coupled

| Steel, buttweld* | Black | Galv |
|---|---|---|
| ⅛-in. | 43 to 41 | 26½ to 24½ |
| ¼-in. | 46 to 44 | 30½ to 28½ |
| 1-in. | 48½ to 46½ | 33½ to 31½ |
| 1¼-in. | 49 to 47 | 34 to 32 |
| 1½-in. | 49½ to 47½ | 34½ to 32½ |
| 2-in. | 50 to 48 | 35 to 33 |
| 2½ to 3-in. | 50½ to 48½ | 35½ to 33½ |

| Steel, lapweld | | |
|---|---|---|
| 2-in. | 39½ | 26 to 24 |
| 2½ to 3-in. | 43½ to 42½ | 28 to 27 |
| 3½ to 6-in. | 46½ to 42½ | 31 to 27 |

| Steel, seamless | | |
|---|---|---|
| 2-in. | 38½ | 23 |
| 2½ to 3-in. | 41½ | 26 |
| 3½ to 6-in. | 43½ | 28 |

| Wrought Iron, buttweld | | |
|---|---|---|
| ⅛-in. | +20½ | +47 |
| ¼-in. | +10½ | +36 |
| ⅜ & ½ in. | + 4½ | +27 |
| ¾-in. | — 1½ | +23½ |
| 1-in. | — 2 | +23 |

| Wrought Iron, lapweld | | |
|---|---|---|
| 2-in. | + 7½ | +31 |
| 2½ to 3½-in. | + 5 | +26½ |
| 4-in. | list | +20½ |
| 4½ to 8-in. | + 2 | +22 |

### Extra Strong, Plain Ends

| Steel, buttweld | | |
|---|---|---|
| ⅛-in. | 42 to 40 | 27 to 25 |
| ¼-in. | 46 to 44 | 31 to 29 |
| 1-in. | 48 to 46 | 34 to 32 |
| 1¼-in. | 48½ to 46½ | 34½ to 32½ |
| 1½-in. | 49 to 47 | 35 to 33 |
| 2-in. | 49½ to 47½ | 35½ to 34½ |
| 2½ to 3-in. | 50 to 48 | 36 to 34 |

| Steel, lapweld | | |
|---|---|---|
| 2-in. | 39½ to 38½ | 25 to 24 |
| 2½ to 3-in. | 44½ to 42½ | 30 to 28 |
| 3½ to 6-in. | 48 to 44 | 33½ to 31½ |

| Steel, seamless | | |
|---|---|---|
| 2-in. | 37½ | 23 |
| 2½ to 3-in. | 41½ | 27 |
| 3½ to 6-in. | 45 | 30½ |

| Wrought Iron, buttweld | | |
|---|---|---|
| ⅛-in. | +16 | +40 |
| ¼-in. | + 9½ | +34 |
| ⅜ to 2-in. | — 1½ | +23 |

| Wrought Iron, lapweld | | |
|---|---|---|
| 2-in. | + 4½ | +27½ |
| 2½ to 4-in. | — 5 | +16 |
| 4½ to 6-in. | — 1 | +20½ |

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct.

*Fontana, Calif., deduct 11 points from figures in left columns.

## BOILER TUBES

*Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.*

| OD in in. | Gage BWG | Seamless H.R. | Seamless C.R. | Electric Weld H.R. | Electric Weld C.D. |
|---|---|---|---|---|---|
| 2 | 13 | $19.18 | $22.56 | $18.60 | $21.89 |
| 2½ | 12 | 25.79 | 30.33 | 25.02 | 29.41 |
| 3 | 12 | 28.68 | 33.76 | 27.82 | 32.74 |
| 3½ | 11 | 35.85 | 42.20 | 34.78 | 40.94 |
| 4 | 10 | 44.51 | 52.35 | 43.17 | 50.78 |

## CAST IRON WATER PIPE

*Per net ton*

6 to 24-in., del'd Chicago ..... $95.70
6 to 24-in., del'd N. Y. ..... $92.50 to 97.40
6 to 24-in., Birmingham ..... 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less ..... 109.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

## MERCHANT WIRE PRODUCTS

*To the dealer, f.o.b. mill*

| | Base Column | Pittsburg, Calif. |
|---|---|---|
| Standard & coated nails* | 103 | 122 |
| Woven wire fence† | 109 | 132 |
| Fence posts, carloads†† | 112 | ... |
| Single loop bale ties | 106 | 130 |
| Galvanized barbed wire** | 123 | 143 |
| Twisted barbless wire | 123 | ... |

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet and Johnstown.

| | Base per 100 lb | Pittsburg, Calif. |
|---|---|---|
| Annealed fence wire‡ | $4.80 | $5.75 |
| Annealed, galv. fencing‡ | 5.25 | 6.20 |
| Cut nails, carloads‡‡ | 6.75 | ... |

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.

‡‡ Less 20¢ to jobbers.

PRODUCING POINTS — *Standard, coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2.

*Fence posts:* Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

*Cut nails:* Wheeling, W. Va., 15; Conshohocken, Pa., 26.

## CLAD STEEL

*Base prices, cents per pound, f.o.b. mill*

| Stainless-carbon | Plate | Sheet |
|---|---|---|
| No. 304, 20 pct, | | |
| Coatesville, Pa. (21) | *26.50 | |
| Washgtn, Pa. (39) | *26.50 | |
| Claymont, Del. (29) | *26.50 | |
| Conshohocken, Pa. (26) | | *22.50 |
| New Castle, Ind. (55) | *26.50 | *24.00 |
| Nickel-carbon | | |
| 10 pct, Coatesville, (26) | 27.50 | |
| Inconel-carbon | | |
| 10 pct, Coatesville, (21) | 36.00 | |
| Monel-carbon | | |
| 10 pct, Coatesville, (21) | 29.00 | |
| No. 302 Stainless-copper-stainless, Carnegie, Pa. (41) | | 75.00 |
| Aluminized steel sheets, hot dip, Butler, Pa., (7) | | 7.75 |

* Includes annealing and pickling, or sandblasting.

## ELECTRICAL SHEETS

*24 gage, HR cut lengths, f.o.b. mill*

| | Cents per lb |
|---|---|
| Armature | 5.45 |
| Electrical | 5.95 |
| Motor | 6.70 |
| Dynamo | 7.50 |
| Transformer 72 | 8.05 |
| Transformer 65 | 8.60 |
| Transformer 58 | 9.30 |
| Transformer 52 | 10.10 |

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Toronto, Ohio, 63; Vandergrift, Pa. 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

**Numbers after producing points correspond to steel producers. See key on previous page.**

## BOLTS, NUTS, RIVETS, SET SCREWS

### Consumer Prices

*(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)*

*Base discount less case lots*

### Machine and Carriage Bolts

| | Pct Off List |
|---|---|
| ½ in. & smaller x 6 in. & shorter | 35 |
| 9/16 & ⅝ in. x 6 in. & shorter | 37 |
| ¾ in. & larger x 6 in. shorter | 34 |
| All diam., longer than 6 in. | 30 |
| Lag, all diam over 6 in. & longer | 35 |
| Lag, all diam x 6 in. & shorter | 37 |
| Plow bolts | 47 |

### Nuts, Cold Punched or Hot Pressed

*(Hexagon or Square)*

| | |
|---|---|
| ½ in. and smaller | 35 |
| 9/16 to 1 in. inclusive | 34 |
| 1⅛ to 1½ in. inclusive | 32 |
| 1⅝ in. and larger | 27 |

On above bolts and nuts, excepting plow bolts, additional allowances of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

### Semifinished Hexagon Nuts

| | USS | SAE |
|---|---|---|
| 7/16 in. and smaller | ... | 41 |
| ½ in. and smaller | 38 | ... |
| ⅝ in. through 1 in. | ... | 39 |
| 9/16 in. through 1 in. | 37 | ... |
| 1⅛ in. through 1½ in. | 35 | 37 |
| 1⅝ in. and larger | 28 | ... |

In full case lots, 15 pct additional discount.

### Stove Bolts

| | |
|---|---|
| Packages, nuts separate | $61.75 |
| In bulk | 70.00 |

### Large Rivets

*(½ in. and larger)*

| | Base per 100 lb |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | $6.75 |
| F.o.b. Lebanon, Pa. | 6.75 |

### Small Rivets

*(7/16 in. and smaller)*

| | Pct off List |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | 48 |

### Cap and Set Screws

| *(In packages)* | Pct Off List |
|---|---|
| Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright | 46 |
| ¾ to 1 in. x 6 in., SAE (1035), heat treated | 35 |
| Milled studs | 19 |
| Flat head cap screws, listed sizes | 5 |
| Fillister head cap, listed sizes | 28 |

## C-R SPRING STEEL

*Base per pound f.o.b. mill*

| | |
|---|---|
| 0.26 to 0.40 carbon | 4.00¢ |
| 0.41 to 0.60 carbon | 5.50¢ |
| 0.61 to 0.80 carbon | 6.10¢ |
| 0.81 to 1.05 carbon | 8.05¢ |
| 1.06 to 1.35 carbon | 10.35¢ |

Worcester, add 0.30¢.

## RAILS, TRACK SUPPLIES

*F.o.b. mill*

| | |
|---|---|
| Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb | $3.20 |
| Joint bars, per 100 lb | 4.25 |
| Light rails per 100 lb | 3.55 |

| | Base Price cents per lb |
|---|---|
| Track spikes | 5.35 |
| Axles | 5.20 |
| Screw spikes | 8.00 |
| Tie plates | 4.05 |
| Tie plates, Pittsburgh, Torr., Calif.* | 4.20 |
| Track bolts, untreated | 8.25 |
| Track bolts, heat treated, to railroads | 8.50 |

*Seattle, add 30¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, Pa., 3.

*Light rails:* All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, Pa. 3; Minnequa, Colo., 14.

*Joint bars:* Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

*Track spikes:* Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, Ohio, 6; Youngstown, 4.

*Track bolts:* Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

*Axles:* Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

*Tie plates:* Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

## TOOL STEEL

*F.o.b. mill*

| W | Cr | V | Mo | Co | Base per lb |
|---|---|---|---|---|---|
| 18 | 4 | 1 | — | — | 90.5¢ |
| 18 | 4 | 1 | — | 5 | $1.42 |
| 18 | 4 | 2 | — | — | $1.025 |
| 1.5 | 4 | 1.5 | 8 | — | 65¢ |
| 6 | 4 | 2 | 6 | — | 69.5¢ |
| High-carbon-chromium | | | | | 52¢ |
| Oil hardened manganese | | | | | 29¢ |
| Special carbon | | | | | 26.5¢ |
| Extra carbon | | | | | 22¢ |
| Regular carbon | | | | | 19¢ |

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

## COKE

| | Net Ton |
|---|---|
| Furnace, beehive (f.o.b. oven) Connellsville, Pa. | $14.00 to $14.50 |
| Foundry, beehive (f.o.b. oven) Connellsville, Pa. | $15.50 to $16.00 |
| Foundry, oven coke | |
| Buffalo, del'd | $20.90 |
| Chicago, f.o.b. | 20.40 |
| Detroit, f.o.b. | 19.40 |
| New England, del'd | 22.70 |
| Seaboard, N. J., f.o.b. | 22.00 |
| Philadelphia, f.o.b. | 20.45 |
| Swedeland, Pa., f.o.b. | 20.40 |
| Plainesville, Ohio, f.o.b. | 20.90 |
| Erie, del'd | $20.25 to 21.04 |
| Cleveland, del'd | 22.62 |
| Cincinnati, del'd | 21.71 |
| St. Paul, f.o.b. | 23.50 |
| St. Louis, del'd. | 21.60 |
| Birmingham, del'd | 18.75 |

## FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

| | |
|---|---|
| 70% or more | $37.00 |
| 60% or less | 34.00 |

## WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 15c to base price except Cincinnati and New Orleans (*), add 10c; New York, Chicago and Boston, add 20c.)

| CITIES | SHEETS | | | STRIP | | PLATES | SHAPES | BARS | | ALLOY BARS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot-Rolled | Cold-Rolled (15 gage) | Galvanized (10 gage) | Hot-Rolled | Cold-Rolled | | Standard Structural | Hot-Rolled | Cold-Finished | Hot-Rolled, A 4615 As-rolled | Hot-Rolled, A 4140-50 Ann. | Cold-Drawn, A 4615 As-rolled | Cold-Drawn, A 4140-50 Ann. |
| Baltimore | 5.31 | 6.21–6.41 | 6.95–7.11 | 5.37 | .... | 5.56 | 5.36 | 5.42 | 6.16 | .... | 9.60–10.10 | .... | .... |
| Birmingham | 4.85 | 5.75 | 6.15 | 4.85 | .... | 5.10 | 4.90 | 4.90 | 6.59 | .... | .... | .... | .... |
| Boston | 5.55 | 6.45–6.75 | 7.11–7.61 | 5.60 | 6.75 | 5.75 | 5.42 | 5.52 | 6.02 | 9.36–9.67 | 9.67–9.87 | 10.72 | 11.02 |
| Buffalo | 4.85 | 5.75 | 7.42–7.57 | 5.24 | 7.27 | 5.35 | 5.06 | 4.95 | 5.40 | 9.30 | 9.60 | 10.65 | 10.95 |
| Chicago | 4.85 | 5.75 | 6.85 | 4.85 | 5.45–6.15 | 5.10 | 4.90 | 4.90 | 5.40 | 8.90 | 9.26 | 10.25 | 10.55 |
| Cincinnati* | 5.16–5.51 | 5.84–6.29 | 6.59–6.93 | 5.28–5.43 | .... | 5.53–5.85 | 5.33 | 5.33–5.48 | 6.08–6.20 | 9.74 | 9.99 | 11.19 | 11.44 |
| Cleveland | 4.85 | 5.75 | 6.70 | 5.02 | .... | 5.21 | 5.01 | 5.01 | 5.45 | 9.05 | 9.35 | 10.40 | 10.70 |
| Detroit | 5.28–5.32 | 6.07–6.16 | 7.38–7.58 | 5.27–5.47 | 6.27–6.58 | 5.52–5.57 | 5.33–5.40 | 5.33–5.55 | 6.00–6.16 | 9.67 | 9.92 | 11.11 | 11.35 |
| Houston | 6.70–6.95 | .... | 7.30 | 6.70 | .... | 6.70 | 6.20–6.70 | 5.40–6.65 | 7.60 | 10.45 | 10.40 | 11.45 | 11.70 |
| Indianapolis | 5.29 | 6.13 | 7.44 | 5.29 | 7.38 | 5.54 | 5.34 | 5.34 | 6.14 | 11.25 | 11.39 | .... | .... |
| Kansas City | 5.50 | 6.40 | 7.50 | 5.50 | 6.98[5] | 5.75 | 5.55 | 5.55 | 6.10 | 9.55 | 9.85 | 10.90 | 11.20 |
| Los Angeles | 5.45 | 7.00 | 7.45 | 5.95 | 7.35[20] | 5.50 | 5.45 | 5.60 | 7.25 | .... | .... | .... | .... |
| Memphis | 5.75–5.80 | 6.60 | 7.20 | 5.80–5.95 | 6.80 | 5.95–6.00 | 5.75 | 5.75 | 6.53 | .... | .... | .... | .... |
| Milwaukee | 5.03 | 5.93 | 7.02 | 5.03–5.38 | 6.32 | 5.28 | 5.08 | 5.08 | 5.63 | 9.53 | 9.73 | 10.98 | 11.23 |
| New Orleans* | 5.95 | 6.75 | .... | 6.15 | .... | 6.15 | 5.95 | 5.95 | 5.65[6] | .... | .... | .... | .... |
| New York | 5.40 | 6.31 | 6.85–6.90 | 5.62 | 6.76 | 5.65 | 5.33 | 5.57 | 6.31 | 9.28 | 9.58 | 10.63 | 10.93 |
| Norfolk | 6.00 | .... | .... | 6.20 | .... | 6.05 | 6.05 | 6.05 | 7.05 | .... | .... | .... | .... |
| Omaha | 6.13 | .... | 8.33 | 6.13 | .... | 6.38 | 6.18 | 6.18 | 6.98 | .... | .... | .... | .... |
| Philadelphia | 4.95 | 6.24[13] | 6.83 | 5.40 | 6.29 | 5.35 | 5.10 | 5.40 | 5.96 | 9.05 | 9.35 | 10.62 | 10.87 |
| Pittsburgh | 4.85 | 5.75 | 6.90 | 5.00 | 6.00 | 5.05 | 4.90 | 4.90 | 5.40 | 8.90 | 9.20 | 10.25 | 10.55 |
| Portland | 6.50[8]–7.05 | 8.00 | 8.80–9.10 | 6.85[8] | .... | 6.30[8] | 6.35[8] | 6.35[8] | 8.25[14] | 10.50[8] | 10.10[8] | .... | .... |
| Salt Lake City | 7.05 | 7.05 | 8.65–8.65 | 7.45[3] | .... | 5.65[3] | 5.50[3] | 7.10[8] | 8.15 | .... | .... | .... | .... |
| San Francisco | 6.15[8] | 7.50[2] | 7.80 | 6.75[8] | 8.25[5] | 6.35[8] | 5.90[8] | 5.90[8] | 7.55 | 9.80 | 10.00 | 11.20 | 11.60 |
| Seattle | 6.70[4]–7.10 | 8.15[2]–8.65 | 8.80–9.30 | 6.70[4] | .... | 6.35[4] | 6.30[4] | 6.20[4] | 8.15[14] | .... | 10.35[15] | .... | 13.10[15] |
| St. Louis | 5.22–5.37 | 6.12–6.27 | 7.32 | 5.22 | 6.68–7.54 | 5.47 | 5.27 | 5.27 | 5.82 | 9.27–9.72 | 9.57–9.97 | 10.62–11.17 | 10.92–11.42 |
| St. Paul | 5.44 | 6.19–6.34 | 7.54–7.64 | 5.44 | 6.82 | 5.64–6.69 | 5.49 | 5.49 | 6.04 | 9.49 | 9.79 | 10.84 | 11.14 |

**BASE QUANTITIES** *Standard unless otherwise keyed on prices.*

**Hot-Rolled:** Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

**Cold-Rolled:** Sheets, 400 to 1499 lb strip, extras on all quantities. Bars 1000 lb and over.

**Alloy Bars:** 1000 to 1999 lb.

**Galvanized Sheets:** 450 to 1499 lb.

**Exceptions:**
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb; (20) 6000 lb and over.

## PIG IRON PRICES

*Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.*

### PRODUCING POINT PRICES

| Producing Point | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
|---|---|---|---|---|---|
| Bethlehem | 48.00 | 48.50 | 49.00 | 49.50 | ..... |
| Birmingham | 38.88 | 39.38 | ..... | ..... | ..... |
| Buffalo | 46.00 | 46.50 | 47.00 | ..... | ..... |
| Chicago | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Cleveland | 46.00 | 46.50 | 46.50 | 47.00 | 51.00 |
| Duluth | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Erie | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Everett | ..... | 50.50 | 51.00 | ..... | ..... |
| Granite City | 47.90 | 48.40 | 48.90 | ..... | ..... |
| Ironton, Utah | 46.00 | 46.50 | ..... | ..... | ..... |
| Lone Star, Texas | 46.00 | 46.50† | ..... | ..... | ..... |
| Pittsburgh | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Geneva, Utah | 46.00 | 46.50 | ..... | ..... | ..... |
| Sharpsville | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Steelton | 46.00 | 46.50 | 49.00 | 49.50 | 54.00 |
| Struthers, Ohio | 46.00 | ..... | ..... | ..... | ..... |
| Swedeland | 46.00 | 46.50 | 49.00 | 49.50 | ..... |
| Toledo | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Troy, N. Y. | 46.00 | 46.50 | 49.00 | ..... | 54.00 |
| Youngstown | 46.00 | 46.50 | 46.50 | 47.00 | ..... |

### DELIVERED PRICES (BASE GRADES)

| Consuming Point | Producing Point | Rail Freight Rate | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
|---|---|---|---|---|---|---|---|
| Boston | Everett | $0.50 Arb. | ..... | 50.50 | 51.00 | ..... | ..... |
| Boston | Steelton | 6.90 | ..... | ..... | ..... | ..... | 60.90 |
| Brooklyn | Bethlehem | 4.29 | ..... | 52.79 | 53.29 | 53.79 | ..... |
| Cincinnati | Birmingham | 6.70 | 45.58 | 46.08 | ..... | ..... | ..... |
| Jersey City | Bethlehem | 2.63 | ..... | 51.13 | 51.63 | 52.13 | ..... |
| Los Angeles | Geneva-Ironton | 7.70 | 53.70 | 54.20 | ..... | ..... | ..... |
| Mansfield | Cleveland-Toledo | 3.33 | 49.33 | 49.83 | 49.83 | 50.33 | 54.33 |
| Philadelphia | Bethlehem | 2.39 | 50.39 | 50.89 | 51.39 | 51.89 | ..... |
| Philadelphia | Swedeland | 1.44 | 49.44 | 49.94 | 50.44 | 50.94 | ..... |
| Philadelphia | Steelton | 3.09 | ..... | ..... | ..... | ..... | 57.09 |
| Rochester | Buffalo | 2.63 | 48.63 | 49.13 | 49.63 | ..... | ..... |
| San Francisco | Geneva-Ironton | 7.70 | 53.70 | 54.20 | ..... | ..... | ..... |
| Seattle | Geneva-Ironton | 7.70 | 53.70 | 54.20 | ..... | ..... | ..... |
| St. Louis | Granite City | 0.75 Arb. | 48.65 | 49.15 | 49.65 | ..... | ..... |
| Syracuse | Buffalo | 3.58 | 49.58 | 50.08 | 50.58 | ..... | ..... |
| Gulf Ports | Lone Star, Texas | ..... | 50.50 | 51.00† | ..... | ..... | ..... |

† Low Phos., Southern Grade.

**Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.**

**Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.**

**Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.**

# FERROALLOYS

### Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

| | |
|---|---|
| F.o.b. Birmingham | $174 |
| F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont. | $172 |
| F.o.b. Johnstown, Pa. | $174 |
| F.o.b. Sheridan, Pa. | $172 |
| F.o.b. Etna, Clairton, Pa. | $175 |

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

| | |
|---|---|
| Carload, bulk | 10.45 |
| Ton lots | 12.05 |
| Less ton lots | 12.95 |

### Spiegeleisen

Contract prices gross ton, lump, f.o.b.

| | 16-19% Mn 3% max. Si | 19-21% Mn 3% max. Si |
|---|---|---|
| Palmerton, Pa. | $64.00 | $65.00 |
| Pgh. or Chicago | 65.00 | 66.00 |

### Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

| | |
|---|---|
| Carload, packed | 35.5 |
| Ton lots | 37.0 |

### Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

| | |
|---|---|
| Carloads | 28 |
| Ton lots | 30 |
| Less ton lots | 32 |

### Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

| | Carloads | Ton | Less |
|---|---|---|---|
| 0.07% max. C, 0.06% P, 90% Mn | 25.25 | 27.10 | 28.30 |
| 0.10% max. C | 24.75 | 26.60 | 27.80 |
| 0.15% max. C | 24.25 | 26.10 | 27.30 |
| 0.30% max. C | 23.75 | 25.60 | 26.80 |
| 0.50% max. C | 23.25 | 25.10 | 26.30 |
| 0.75% max. C, 7.00% max. Si | 20.25 | 22.10 | 23.30 |

### Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

| | |
|---|---|
| Carload bulk | 8.95 |
| Ton lots | 10.60 |
| Briquet, contract basis carlots, bulk delivered, per lb of briquet | 10.30 |
| Ton lots | 11.90 |
| Less ton lots | 12.80 |

### Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area: Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

### Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

| | |
|---|---|
| 96% Si, 2% Fe | 20.70 |
| 97% Si, 1% Fe | 21.10 |

### Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

| | |
|---|---|
| Carload, bulk | 6.30 |
| Ton lots | 7.90 |
| Less ton lots | 8.80 |

### Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

| | |
|---|---|
| 25% Si | 17.00 |
| 50% Si | 11.30 |
| 75% Si | 13.50 |
| 85% Si | 14.65 |
| 90-95% Si | 16.50 |

### Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

| | Cast | Turnings | Distilled |
|---|---|---|---|
| Ton lots | $2.05 | $2.95 | $3.75 |
| Less ton lots | 2.40 | 3.30 | 4.55 |

### Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

| | |
|---|---|
| 0.06% C | 28.75 |
| 0.10% C | 28.25 |
| 0.15% C | 28.00 |
| 0.20% C | 27.75 |
| 0.50% C | 27.50 |
| 1.00% C | 27.25 |
| 2.00% C | 27.00 |
| 65-69% Cr, 4-9% C | 20.50 |
| 62-66% Cr, 4-6% C, 6-9% Si | 21.35 |

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

| | |
|---|---|
| Carload bulk | 13.75 |
| Ton lots | 15.25 |
| Less ton lots | 16.15 |

### High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

### S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

| | |
|---|---|
| Carloads | 21.60 |
| Ton lots | 23.75 |
| Less ton lots | 25.25 |

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

| | |
|---|---|
| Carloads | 27.75 |
| Ton lots | 30.05 |
| Less ton lots | 31.85 |

### Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

| | |
|---|---|
| 0.20% max. C | 1.09 |
| 0.50% max. C | 1.05 |
| 9.00% min. C | 1.04 |

### Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

| | |
|---|---|
| Carloads | 17.90 |
| Ton lots | 21.00 |
| Less ton lots | 22.50 |

### Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

| | |
|---|---|
| Carloads | 19.25 |
| Ton lots | 21.55 |
| Less ton lots | 22.55 |

### CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

| | |
|---|---|
| Ton lots | 19.75 |
| Less ton lots | 21.00 |

### V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis.. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

| | |
|---|---|
| Ton lots | 15.75¢ |
| Less ton lots | 17.00¢ |

### Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

| | |
|---|---|
| Carload packed | 17.00¢ |
| Ton lots to carload packed | 18.00¢ |
| Less ton lots | 19.50¢ |

### SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

| | |
|---|---|
| Ton lots | 17.25 |
| Less ton lots | 18.50 |

### Other Ferroalloys

| | |
|---|---|
| Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y. Carload | 7.40¢ |
| Ton lots | 8.80¢ |
| Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo. | 96¢ |
| Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb. Ton lots | $2.90 |
| Less ton lots | 2.95 |
| Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. | $1.10 |
| Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton | $65.00 |
| 10 tons to less carload | 75.00 |
| Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti | $1.28 |
| Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti | $1.40 |
| Less ton lots | 1.45 |
| Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton | $160.00 |
| Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered | $2.25 |
| Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V. Openhearth | $2.90 |
| Crucible | 3.00 |
| High speed steel (Primos) | 3.10 |
| Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per lb contained Mo. | 95¢ |
| Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound Carload, bulk, lump | 11.00¢ |
| Ton lots, bulk, lump | 11.50¢ |
| Ton lots, packed, lump | 11.75¢ |
| Less ton lots, lump | 12.25¢ |
| Vanadium pentoxide, 88-92% $V_2O_5$ contract basis, per pound contained $V_2O_5$ | $1.30 |
| Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy. Ton lots | 21.00¢ |
| Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy. Carload, bulk | 6.60¢ |

### Boron Agents

| | |
|---|---|
| Contract prices, per lb of alloy, del. | |
| Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B | $4.25 |
| Bortam, f.o.b. Niagara Falls Ton lots, per pound | 45¢ |
| Less ton lots, per pound | 50¢ |
| Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%. Ton lots, per pound | 8.625¢ |
| Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots | $1.20 |
| F.o.b. Wash., Pa.: 100 lb and over | .75 |
| 10 to 14% B. | 1.20 |
| 14 to 19% B. | 1.50 |
| 19% min. B. | |
| Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over. No. 1 | 93¢ |
| No. 6 | 63¢ |
| No. 79 | 45¢ |
| Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered. Ton lots | $1.67 |
| Less ton lots | 1.79 |
| Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered. Less ton lots | $1.80 |
| Silcaz, contract basis, delivered Ton lots | 45.00¢ |

## IMPORTED ORES

### Beryllium Ore

Imported ore, 10 to 12% BeO, $25 to $27 per short ton unit, c.i.f. U. S. ports.

### Chrome Ore

Imported ore, per gross ton, dry basis, subject to penalties if guarantees are not met, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Ore., and/or Tacoma, Wash.

| | |
|---|---|
| Indian and African | |
| 48% $Cr_2O_3$, 3 to 1 ratio | $39.00 |
| 48% $Cr_2O_3$, 2.8 to 1 ratio | 37.50 |
| 48% $Cr_2O_3$, no ratio | 31.00 |
| Philippine Islands | |
| 48% $Cr_2O_3$, 3 to 1 ratio | $39.00 to 41.00 |
| Rhodesian | |
| 48% $Cr_2O_3$, 3 to 1 ratio | $39.00 |
| 48% $Cr_2O_3$, no ratio | 30.00 |
| 45% $Cr_2O_3$, no ratio | $27.00 to 27.50 |
| South African (Transvaal) | |
| 50% $Cr_2O_3$, no ratio | $29.50 to 30.50 |
| 48% $Cr_2O_3$, no ratio | 29.00 to 30.00 |
| 45% $Cr_2O_3$, no ratio | 26.50 |
| 44% $Cr_2O_3$, no ratio | 25.50 to 26.00 |
| Turkish | |
| 48% $Cr_2O_3$, 3 to 1 ratio | $39.00 to 41.00 |
| Domestic | |
| 48% $Cr_2O_3$, 3 to 1 ratio, f.o.b. nearest shipping point | $39.00 |

### Manganese Ore

On long-term contracts involving large tonnages prices are nominal and subject to other factors of negotiation. Nearby business, basis 48% Mn, duty paid, 81.8¢ to 83.8¢ per long ton unit, c.i.f. U. S. ports. Prices on lower grade ore is adjusted to the Mn content and may be subject to penalties according to the content of impurities.

### Titanium Ore

Imported ore, ilmenite, 56 to 59% $TiO_2$, c.i.f. Atlantic seaboard, $16 to $18 per gross ton, according to grade and impurities. Rutile, granular form, per lb, guaranteed minimum 94 to 96% concentrate, $90 to $100 per short ton, c.i.f. carload lots, Atlantic seaboard.

Note — Prices on many foreign ores show fluctuations that are dependent on quality, quantity, commissions, delivery and other factors of negotiation. Quotations are considered representative, but may be subject to penalties or premiums, according to the content of impurities, etc.

Short ton unit equals 20.0 lb.

Long ton unit equals 22.4 lb.

Ore prices per ton are calculated by multiplying the price per unit of contained metal by the number of units per ton. The number of units per ton is the percentage figure.

## LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*)

| | *Per gross ton* |
|---|---|
| Old range, bessemer | $7.60 |
| Old range, nonbessemer | 7.45 |
| Mesabi, bessemer | 7.35 |
| Mesabi, nonbessemer | 7.20 |
| High phosphorus | 7.20 |

## REFRACTORIES

(*F.o.b. works*)

### Fire Clay Brick

| | *Carloads, Per 1000* |
|---|---|
| First quality, Pa., Ky., Mo., Ill. (except Salina, Pa., add $5) | $80.00 |
| No. 1 Ohio | 74.00 |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 74.00 |
| No. 2 Ohio | 66.00 |
| Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) | 11.50 |

### Silica Brick

| | |
|---|---|
| Mt. Union, Pa., Ensley, Ala. | $80.00 |
| Childs, Pa. | 84.00 |
| Hays, Pa. | 85.00 |
| Chicago District | 89.00 |
| Western, Utah and Calif. | 95.00 |
| Super Duty, Hays, Pa., Athens, Tex. | $85.00 to 95.00 |
| Silica cement, net ton, bulk, Eastern (except Hays, Pa.) | $13.75 to 14.00 |
| Silica cement, net ton, bulk, Hays, Pa. | 16.00 |
| Silica cement, net ton, bulk, Ensley, Ala. | 15.00 |
| Silica cement, net ton, bulk, Chicago District | $14.75 to 15.00 |
| Silica cement, net ton, bulk, Utah and Calif. | 21.00 |

### Chrome Brick

| | *Per Net Ton* |
|---|---|
| Standard chemically bonded, Balt., Chester | $69.00 |

### Magnesite Brick

| | |
|---|---|
| Standard, Balt. and Chester | $91.00 |
| Chemically bonded, Balt. and Chester | 80.00 |

### Grain Magnesite

*Std. ⅜-in. grains*

| | |
|---|---|
| Domestic, f.o.b. Balt. and Chester, in bulk, fines removed | $56.00 to 56.50 |
| Domestic, f.o.b. Chewelah, Wash., in bulk with fines | $30.50 to 31.00 |
| in sacks with fines | 35.00 to 35.50 |

### Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢.. $12.25

## METAL POWDERS

*Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.*

| | |
|---|---|
| Swedish sponge iron c.i.f. New York, ocean bags | 7.4¢ to 9.0¢ |
| Domestic sponge iron, 98+% Fe, carload lots | 9.0¢ to 15.0¢ |
| Electrolytic iron, annealed, 99.5+% Fe | 31.5¢ to 39.5¢ |
| Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe | 48.5¢ |
| Hydrogen reduced iron, minus 300 mesh, 98+% Fe | 63.0¢ to 80.0¢ |
| Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe | 90.0¢ to $1.75 |
| Aluminum | 29.00¢ |
| Antimony | 45.78¢ |
| Brass, 10 ton lots | 22.75 to 25.25¢ |
| Copper, electrolytic | 27.75¢ |
| Copper, reduced | 27.625¢ |
| Cadmium | $2.40 |
| Chromium, electrolytic, 99% min. | $3.50 |
| Lead | 21.55¢ |
| Manganese | 55.00¢ |
| Molybdenum, 99% | $2.65 |
| Nickel, unannealed | 61.00¢ |
| Nickel, spherical, minus 30 mesh, unannealed | 68.00¢ |
| Silicon | 34.00¢ |
| Solder powder | 8.5¢ plus metal cost |
| Stainless steel, 302 | 75.00¢ |
| Tin | $1.08 |
| Tungsten, 99% | $2.90 |
| Zinc, 10 ton lots | 15.50 to 18.25¢ |

## ELECTRODES

**Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed**

| Diameter in in. | Length in in. | |
|---|---|---|
| Graphite | | |
| 17, 18, 20 | 60, 72 | 16.00¢ |
| 8 to 16 | 48, 60, 72 | 16.50¢ |
| 7 | 48, 60 | 17.75¢ |
| 6 | 48, 60 | 19.00¢ |
| 4, 5 | 40 | 19.50¢ |
| 3 | 40 | 20.50¢ |
| 2½ | 24, 30 | 21.00¢ |
| 2 | 24, 30 | 23.00¢ |
| Carbon | | |
| 40 | 100, 110 | 7.50¢ |
| 35 | 65, 110 | 7.50¢ |
| 30 | 65, 84, 110 | 7.50¢ |
| 24 | 72 to 104 | 7.50¢ |
| 17 to 20 | 84, 90 | 7.50¢ |
| 14 | 60, 72 | 8.00¢ |
| 10, 12 | 60 | 8.25¢ |
| 8 | 60 | 8.50¢ |

## Requests Freight Rate Cut

**Chicago** — Republic Steel Corp. has requested a reduction in carload freight rates on iron and steel articles from Chicago to the Twin Cities. Republic has proposed a reduction on the present rate of 64¢ per 100 lb on carloads with a minimum weight of 60,000 lb to 31¢. They have also requested that this rate not be subject to increases under Ex Parte 162, 166, or 168. Rates would apply on shipments from Chicago, Peoria and Granite City, Ill. The Western Trunk Line Committee has already approved a rate reduction on iron and steel articles from Sterling, Ill., to the Twin Cities.

## French Gray Iron Groups Here

**Washington**—A delegation of 17 representatives of the French gray iron foundry industry arrived in this country last month to begin a 6-week study of American methods.

Following the general outline of such visits, the Frenchmen will visit foundries in Chicago, Milwaukee, Detroit, Cleveland, and Pittsburgh. Included will be at least one visit each to a foundry producing for heavy equipment and one specializing in mass-production for the automobile industry. Discussion of foundry costs will be an important feature of the visits.

## Mill Continues Operations

**Portland, Ore.** — Oregon Steel Mills here continues to produce bars and small shapes at near capacity. Officials here reported they did not anticipate any possibility of a shutdown.

Steel warehouses are in much the same condition as those throughout the West with abundant stocks of almost everything except light gauge galvanized sheets and hot and cold-rolled steel sheets. There has been some evidence of a shortage of nails and the possibility of a run on those available might be expected.

Open upward smoothly, easily
Save floor and wall space
Coil completely out of way
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Motor or manual control

You get better door service at lower cost in Kinnear's combination of efficient *coiling upward action* and protective, all-metal, *interlocking-slat construction.* Kinnear Rolling Doors give you *maximum* use of space around doorways. They open and close with smooth, time-saving ease, year after year. They defy wind, weather, or intrusion. Electric push-button operation available, with remote controls if desired. Kinnear Rolling Doors are built in any size, for new or old construction. Write for complete details today.

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*Offices and Agents in Principal Cities*

SAVING WAYS in DOORWAYS

KINNEAR ROLLING DOORS


## Iron Age Introduces

*Continued from Page 23*

**Charles W. T. Stuart** has been elected to the board of directors of the AMERICAN ARCH CO. OF DELAWARE and the AMERICAN ARCH CO., INC., New York. Mr. Stuart is president and director of Safety Car Heating & Lighting Co.

ROBERT W. CLYNE, manager, passenger, locomotive and industrial department, railway sales division, American Steel Foundries.

**Robert W. Clyne** has succeeded **Armand H. Peycke** as manager of the passenger, locomotive and industrial department, railway sales division of AMERICAN STEEL FOUNDRIES, Chicago. Mr. Peycke has retired from active duty, but will continue to be available in a consulting capacity, and for special assignments.

**Joseph A. Conlon** has succeeded **William T. Keenan** as district sales manager of the Chicago Branch, mechanical goods division, UNITED STATES RUBBER CO., New York. Mr. Keenan has retired after 39 years with the company. Mr. Conlon was formerly the division's district sales manager, and has been with the organization since 1930.

**John E. McKeen** has been elected president of CHAS. PFIZER & CO., Brooklyn. He formerly served as executive vice-president, and has been with the organization for 23 years. **Maynard E. Simond** has resigned as president of F. Eberstadt & Co., Inc., and has been elected chairman of the

FOR PRECISION TUBING WHATEVER THE . . .
SIZE Precision Tubing is available in sizes which cover a range of 0.500 inches to 0.010 inches outside diameter, wall thicknesses down to 0.0015 inches. Through continuous hydrogen atmosphere annealing furnaces and tungsten carbide tooling, dimensions you specify within this range are held to extremely close tolerances.
SHAPE Precision Tubing can be drawn to almost any shape desired and is often preformed to facilitate secondary operations. Round, rectangular, oval, or square—any dimensions you specify within Precision's standard ranges are produced to meet the most exacting dimensional requirements.
ALLOY Precision's continuous endeavor to use only the best metal for any particular application has imbued it with a sound working knowledge of an almost limitless variety of non-ferrous alloys. Controlled production cycles make possible the correct temper, a clean smooth finish, and the precise uniformity so essential to long life.
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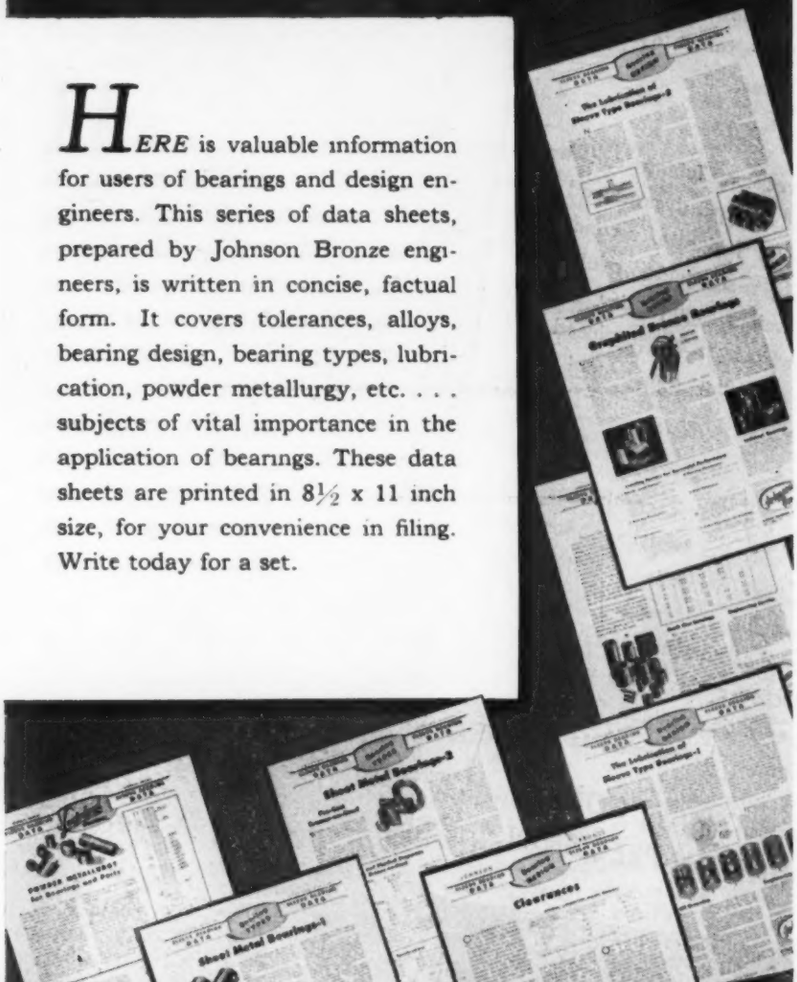


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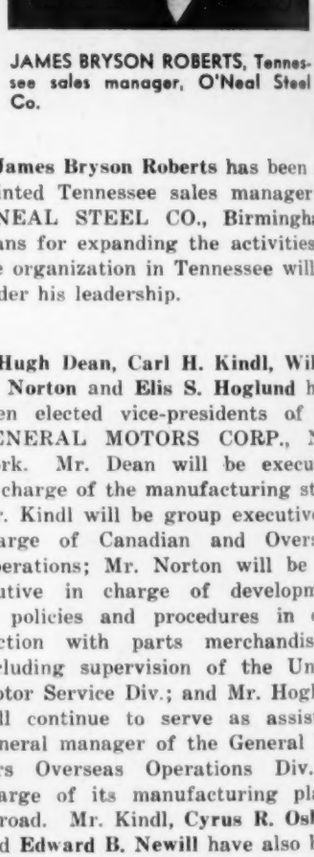
## IRON AGE INTRODUCES

*Continued*

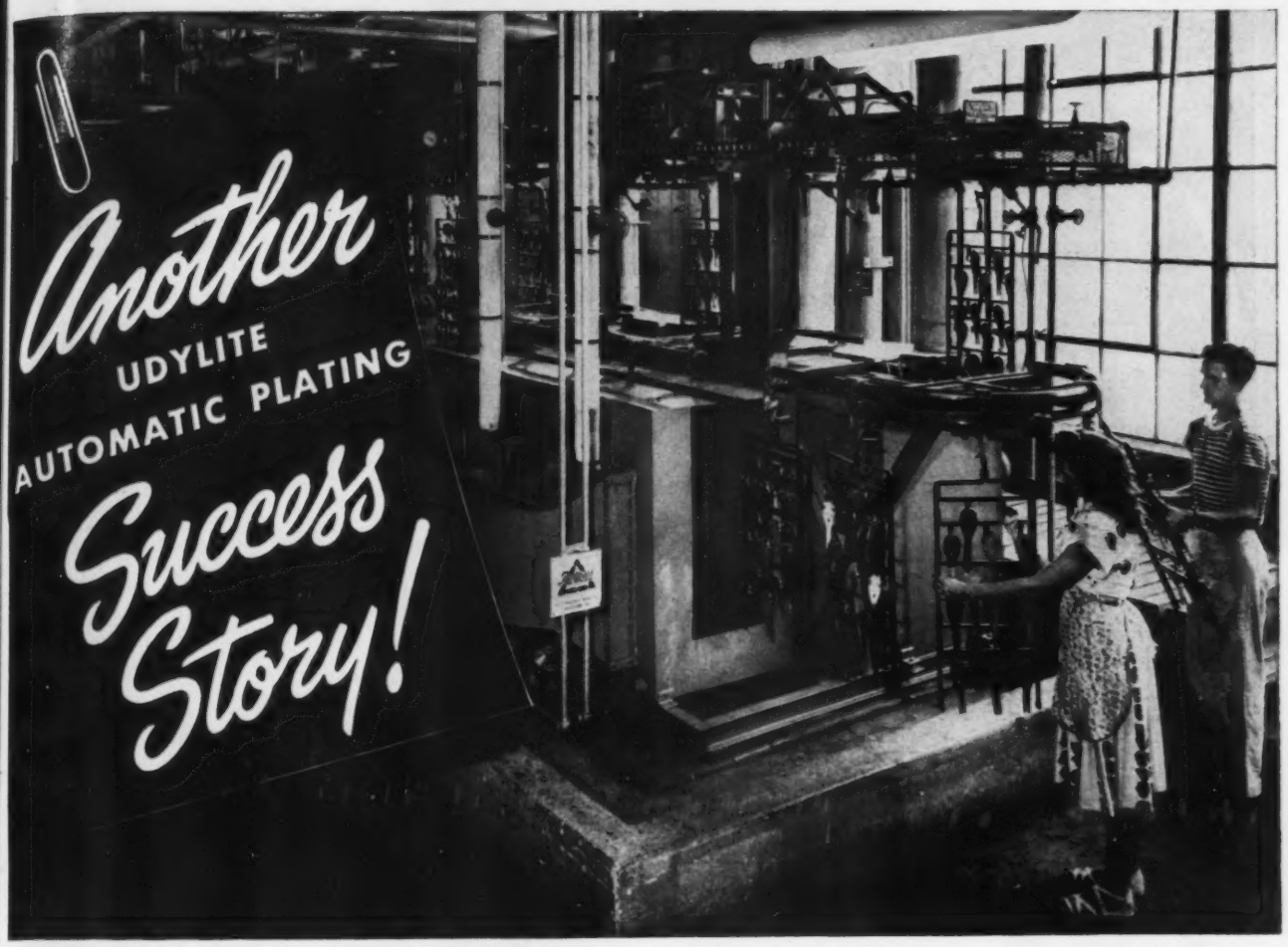
executive committee. **John L. Davenport** was elected executive vice-president, and **Herman A. Poitras** was named vice-president in charge of production to succeed Mr. Davenport. **Allen J. Greene** was appointed general production manager to succeed Mr. Poitras.



JAMES BRYSON ROBERTS, Tennessee sales manager, O'Neal Steel Co.

**James Bryson Roberts** has been appointed Tennessee sales manager of O'NEAL STEEL CO., Birmingham. Plans for expanding the activities of the organization in Tennessee will be under his leadership.

**Hugh Dean, Carl H. Kindl, Wilbur H. Norton** and **Elis S. Hoglund** have been elected vice-presidents of the GENERAL MOTORS CORP., New York. Mr. Dean will be executive in charge of the manufacturing staff; Mr. Kindl will be group executive in charge of Canadian and Overseas Operations; Mr. Norton will be executive in charge of development of policies and procedures in connection with parts merchandising, including supervision of the United Motor Service Div.; and Mr. Hoglund will continue to serve as assistant general manager of the General Motors Overseas Operations Div. in charge of its manufacturing plants abroad. Mr. Kindl, **Cyrus R. Osborn** and **Edward B. Newill** have also been elected members of the administration committee. **Daniel F. Hulgrave** has been named director of procurement and schedules for the company to succeed **Roger M. Kyes** who has been named assistant general manager of

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**240 Man-Hours Saved Per Week!**

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ROLLER SKATES

You can get results like these in YOUR plant, just as the Rollfast people did, by a simple and quick conversion to Udylite automatic machines.

You'll be miles ahead by choosing *Udylite*, because of important "hidden" values like these that don't show up in the initial estimate:

No long tie-ups in the plating room during installation—Udylite machines, shipped ready to run, can usually be installed over a week-end, and require but a few machinery movers. These compact machines require less working space, solving the load-and-unload space problem. Racks are within easy reach. And Udylite machines have astonished users with their low maintenance costs.

Write a "success story" like the one above in *your* plant—plan now to "go automatic" with Udylite equipment! We'll be glad to make recommendations, entirely without cost or obligation. Write *today*.

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MULTIGRIP
FLOOR PLATE
● Wet or dry, U·S·S Multigrip Floor Plate offers skid resistance and traction in every direction . . . cuts down on accidents due to slips and falls. Multigrip's flat-topped risers are comfortable underfoot . . . tend to lessen fatigue.
Multigrip won't chip, crack, splinter . . . won't absorb grease or oil. It adds to the structural strength of the floor. And Multigrip is permanent.
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TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK
USS
MULTIGRIP FLOOR PLATE
UNITED STATES STEEL

## IRON AGE INTRODUCES

*Continued*

the Truck & Coach Div. Steve Richards has been put in charge of public relations, Buick Motor Div. Mr. Richards was previously on the publicity staff of the Kudner Agency, Inc.

E. RICHARD WALTER, midwest sales representative, plastic metals div., National Radiator Co.

**E. Richard Walter** has been appointed midwestern sales representative of the plastic metals division, NATIONAL RADIATOR CO., Johnstown, Pa. Mr. Walter comes to the organization from Powdered Metal Products Corp., Chicago.

**L. P. Moore** has been named manager, new products development dept., AMERICAN CYANAMID CO., New York. Dr. Moore has served as the company's European technical representative since 1946, and will be succeeded in this position by **E. W. Cook**. Dr. Cook is the former assistant chemical director for the company.

**D. L. Irvine** has been appointed assistant general manager of sales, WHEELING STEEL CORP., Wheeling, W. Va. Mr. Irvine succeeds **W. M. Hall**, who was recently made general manager of sales. **F. A. McClelland** has been named manager of sales for the corporation.

**Harry N. Bedford** succeeds **Milton D. Lemieux** as manager of production planning and control, BAUSCH & LOMB OPTICAL CO., Rochester, N. Y. Mr. Lemieux was recently placed in charge of inventory control for the optical firm's affiliated companies and

# ARC WELDING CUTS SHOP LOSSES ...lowers manufacturing costs

By A. G. Kullberg, Assistant Chief Engineer
Bay City Shovels, Inc.
Bay City, Michigan

By converting many of our power shovel parts over to welded construction, we have cut our manufacturing costs. Component parts that once required several weeks to complete are now being produced in as little as 10 days. Important also is the greater flexibility gained by reducing the number of patterns and the dependency on outside sources for cast materials, thus permitting product changes more quickly and at less expense.

Many of our power shovel parts are now fabricated from steel plate and from standard mill shapes. Formed parts are held in simple clamp fixtures and assembled by arc welding with Lincoln "Fleetweld 7" electrodes and Lincoln "Shield-Arc" DC welders or "Fleetwelder" AC arc welders. The AC arc welders are used on boxed-up members where arc blow otherwise limits the use of high welding currents.

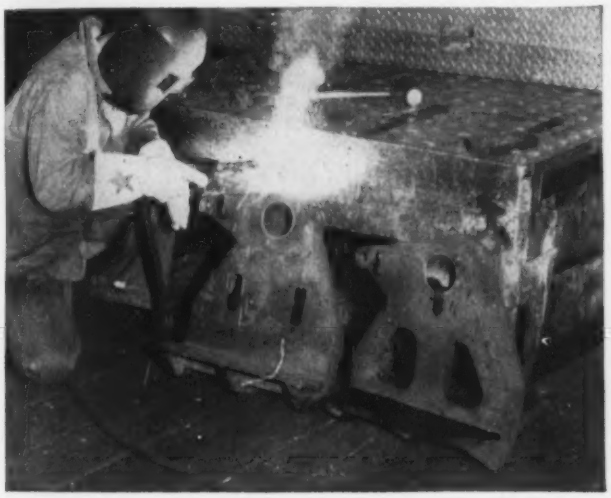

Fig. 1. *Rigid, strong and lightweight . . . This sheave-cage-to-boom assembly is typical of the high quality achieved at Bay City Shovels, Inc., Bay City, Michigan, with Lincoln "Fleetweld 7" electrodes and "Fleetwelder" AC machines.*

Our shop today is using arc welding to fabricate such shovel parts as buckets, booms, power transmission gear cases and motor mounts where strength is a prime requisite. We also build many of our smaller operating parts like handles, links and levers with arc welding—including sheet metal work up to 12 gauge for guards and cabs.

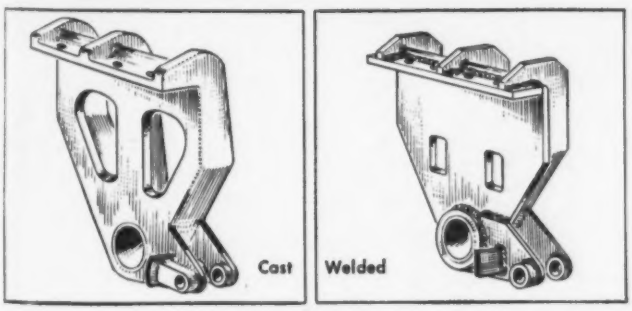


Fig. 2. Lowers cost 30% on Dipper Handle Yoke . . . *Eliminates need for more costly castings by fabricating part from lower cost steel plate and standard mill shapes.*

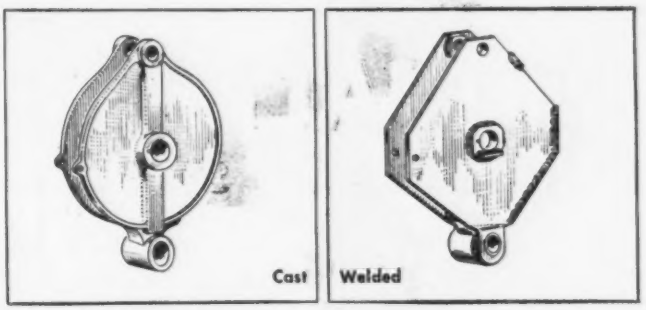


Fig. 3. Cuts material costs 54% on Dipper Sheave Cage . . . *Also eliminates excessive straightening and chipping formerly needed before machining. Total cost reduction on this part is 28%.*

*The above is published by* **THE LINCOLN ELECTRIC COMPANY** *in the interests of progress. Machine Design Studies are available to engineers and designers. Write on your letterhead to The Lincoln Electric Company, Dept. 511, Cleveland 1, Ohio.*

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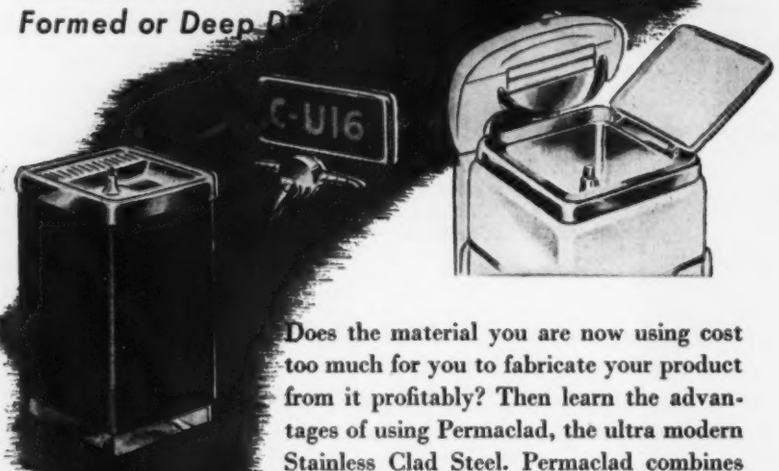


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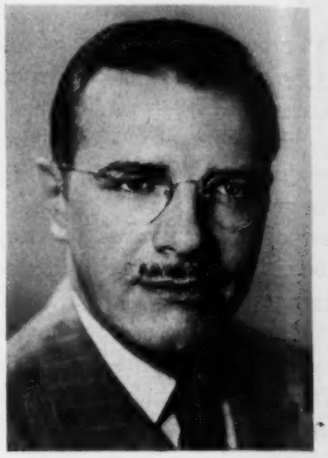
## IRON AGE INTRODUCES

*Continued*

branch offices. Until lately, Mr. Bedford was associated with McKinsey & Co. of New York.



A. CHARLES AMANN, Industrial sales manager, Stamford Plant, Yale & Towne Mfg. Co.

**A. Charles Amann** has been appointed industrial sales manager, Stamford Div., THE YALE & TOWNE MFG. CO., New York. Mr. Amann came to the company in 1949 from the Illinois Lock Co., where he was vice-president and director of sales and advertising.

**Alonzo J. Edgar** has been appointed general manager of HUNT-SPILLER MFG. CO., Boston. Mr. Edgar comes to the company from the Benton Harbor Malleable Iron Co., where he has been employed as works manager since 1946.

**Wilford H. Schubel** has been appointed traveling freight agent, WABASH RAILROAD CO., St. Louis. He succeeds **William J. Imgrund,** who has been promoted to traveling freight and passenger agent at Houston.

**Charles E. Stevens** has joined the CHICAGO RAILWAY EQUIPMENT CO., Chicago, as plant manager. Mr. Stevens is the former chief engineer of the Al-Find Div., Fairchild Engine & Airplane Corp.

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# Permanent Mold Gray Iron Castings for HYDRAULIC APPLICATIONS

- Free machinability
- Dense, non-porous structure
- Freedom from leakage under pressure
- Machines to high, mirror-like finish
- Properly annealed; no growth or distortion after machining.

Eaton Foundry Division engineers will be glad to discuss the application of Eaton Permanent Mold Gray Iron Castings to your product. Send for the illustrated booklet, "A Quick Picture of the Eaton Permanent Mold Process for Producing Gray Iron Castings."

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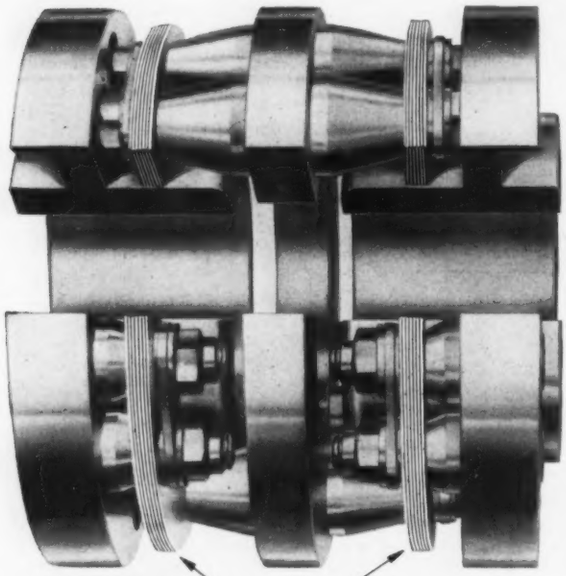

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**THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.**

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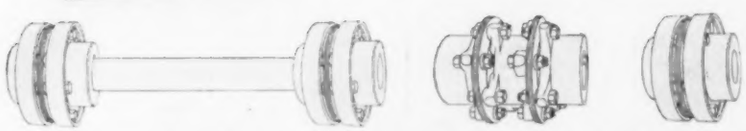
• • •

**ALL PARTS ARE SOLIDLY BOLTED TOGETHER.**



*Write for the latest reprint of our Engineering Catalog.*

**THOMAS FLEXIBLE COUPLING CO.**
WARREN, PENNSYLVANIA


## IRON AGE INTRODUCES

*Continued*

**Anthony J. Lombardi** has been appointed warehouse supervisor, replacing **Carl E. Berndt, of the TIMKEN ROLLER BEARING CO.**, Canton, Ohio. Mr. Lombardi has been named manager of warehouse products for the company.

**Howard E. Carson** has been appointed manager of market research and sales analysis, **WILLYS-OVERLAND MOTORS, INC.**, Toledo. Mr. Carson was formerly manager of market research and sales analysis of Kaiser-Frazer Corp.

**L. W. Clarke** has been elected a director of the **PHILIP CAREY MFG. CO.**, Cincinnati. Mr. Clarke is the company's vice-president in charge of sales.

**T. H. Cable** has been named a member of the sales department, central staff, **KOPPERS CO., INC.**, Pittsburgh. Mr. Cable has been eastern advertising manager for the Westinghouse Electric Corp. for the last three years.

**A. Myles Younger** has been promoted to vice-president in charge of sales, **ATLAS MINERAL PRODUCTS CO.**, Mertztown, Pa. Mr. Younger joined the firm in 1939, and prior to his present appointment was general sales manager for the company.

**John T. Wetzel** has been appointed plant manager, **TUBE REDUCING CORP.**, Wallington, N. J. Mr. Wetzel was formerly assistant to the president of Curtis Wright Corp.

**Edward W. Bowman** has been appointed engineer, Arch & Wall Sales Div., **LACLEDE-CHRISTY CO.**, St. Louis. He will make his headquarters in the general sales office, Pittsburgh.

## IRON AGE INTRODUCES

*Continued*

Whitney **E. McDowell** has been appointed to the sales staff of BARNEY I. FLOREY CO., Cleveland. Before joining the Florey Co. he worked for the American Steel & Wire Co., and then was a field engineer for the Edison Storage Battery Div. of Thomas A. Edison, Inc.

**W. C. Stolk,** recently elected executive vice-president of the AMERICAN CAN CO., New York, has been made a director of the organization. Mr. Stolk succeeds **James B. Taylor,** a member of the board for 27 years, who has retired because of ill health.

**Samuel G. Morse** has been named supervisor of territories and franchises for WILLYS-OVERLAND MOTORS, INC., Toledo. Mr. Morse has been associated with the Detroit Diesel Engine Div. of the General Motors Corp. as assistant to the organization manager.

**H. P. Ladds** has been elected to the board of directors, LOCK THREAD CORP., Detroit. He succeeds the late **Charles F. Newpher,** who was also an executive and director of the organization.

**E. G. Schroeder** has been named field sales manager of ELECTRIC PRODUCTS CO., Cleveland. Mr. Schroeder joined the organization in 1945 to head-up the company's Detroit district office.

**Harry L. Stiles** has been named vice-president in charge of engineering, GEUDER, PAESCHKE & FREY CO., Milwaukee. Mr. Stiles comes to his new position after 4 years as managing engineer for the Chicago Electric Mfg. Co.

## OBITUARY

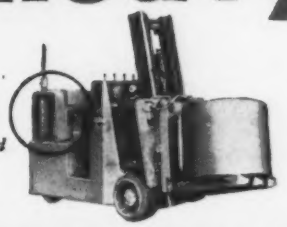
**Raymond H. Martin,** 55, plant and sales manager of the Bassick-Sack Div., The Bassick Co., died Sept. 21.

**John Blair Sutton,** 67, president of the Sutton Engineering Co., died Sept. 25.

**B. L. Walters,** 74, chairman of the board of Lyons Metal Co., died Sept. 28.

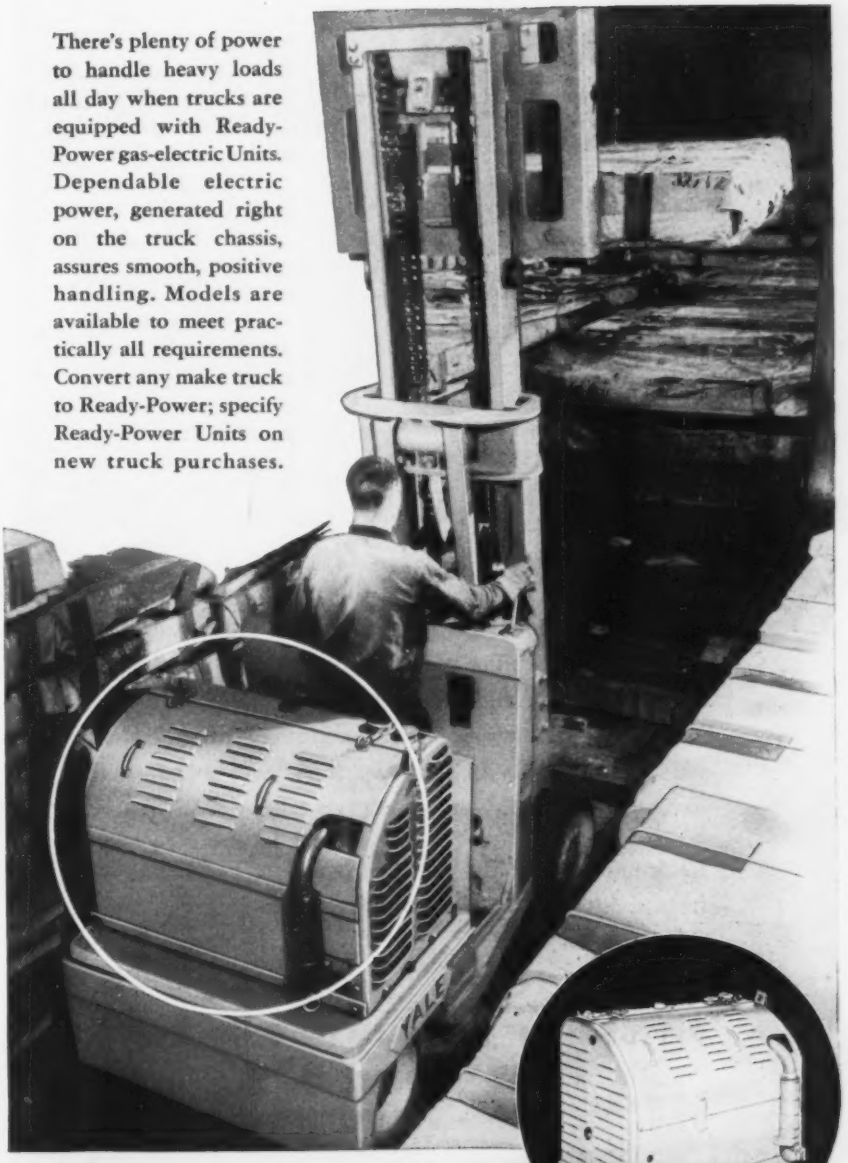
*Resume Your Reading on Page 24*


# heavy loads need READY-POWER



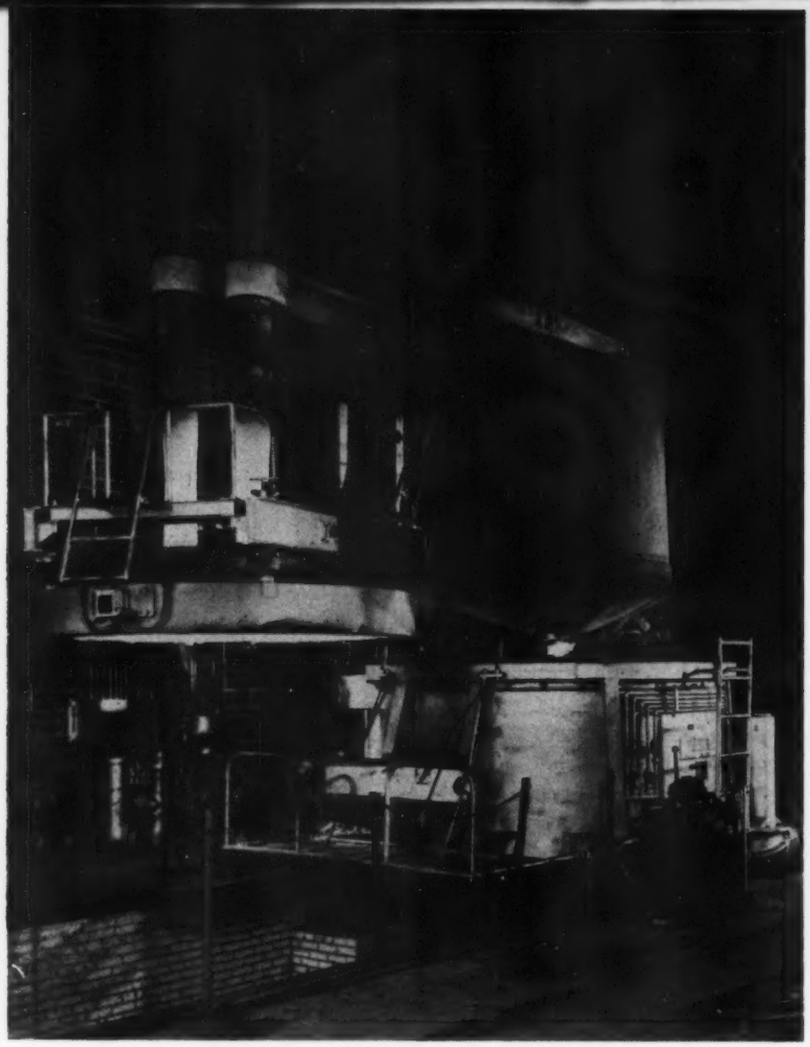
*Ready-Power-equipped Baker truck*

There's plenty of power to handle heavy loads all day when trucks are equipped with Ready-Power gas-electric Units. Dependable electric power, generated right on the truck chassis, assures smooth, positive handling. Models are available to meet practically all requirements. Convert any make truck to Ready-Power; specify Ready-Power Units on new truck purchases.




THE READY-POWER CO.

3822 Grand River Ave., Detroit 8, Michigan



Recharging a Moore Rapid Lectromelt Furnace, like the size OT pictured above, is a simple, time-saving operation. You merely raise the roof hydraulically, swing it aside, then dump the scrap charge. In a mere matter of moments your Lectromelt is melting again, producing more in less time. This great reduction in down time, plus substantial labor savings, will bring your operating costs down.

Lectromelt furnaces are available in capacities ranging from 100 tons to 250 pounds. Write today for complete information.

**PITTSBURGH LECTROMELT FURNACE CORP.**

**PITTSBURGH 30, PA.**

MOORE RAPID Lectromelt FURNACES

manufactured in: CANADA, Lectromelt Furnaces of Canada, Ltd., Toronto 2; ENGLAND, Birlec, Ltd., Birmingham; SWEDEN, Birlec Elektkougnar A/B, Stockholm; AUSTRALIA, Birlec Ltd., Sydney; FRANCE, Stein et Roubaix, Paris; BELGIUM, S. A. Belge Stein et Roubaix, Bressoux-Liege; SPAIN, General Electrica Espanola, Bilbao; ITALY, Forni Stein, Genoa.

# FREE

## PUBLICATIONS

*Continued from Page 34*

methods. *Michigan Tool Co. For more information, check No.* 12 *on the postcard on p.* 35.

### Steel Doors

Interior steel doors and frames and sliding closet door units are described in bulletin No. 16-A. Included are drawings of features and specifications. *American Welding & Mfg. Co. For more information, check No.* 13 *on the postcard on p.* 35.

### Abrasive

New bulletin describes how 32 Alundum abrasives in various grinding wheel shapes cut cost of grinding operations. *Norton Co. For more information, check No.* 14 *on the postcard on p.* 35.

### Shelving

Straight and rotating steel shelving units are described and illustrated in 4-p. bulletin. *The Frick-Gallagher Mfg. Co. For more information, check No.* 15 *on the postcard on p.* 35.

### Dust Collectors

An industry report on the use of Dustube dust collectors in the manufacture of fertilizer is now available. *American Wheelabrator and Equipment Corp. For more information, check No.* 16 *on the postcard on p.* 35.

### Industrial Coupler

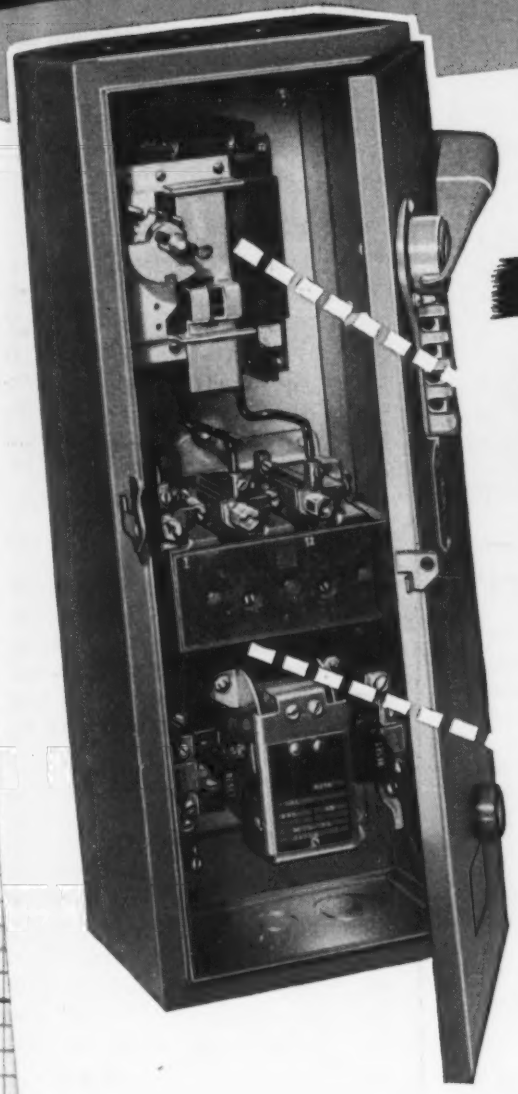
A new booklet describes self-centering, self-leveling coupler that features wide gathering range, both horizontal and vertical. *American Steel Foundries. For more information, check No.* 17 *on the postcard on p.* 35.

### Soldering Flux

Rubyfluid soldering and tinning fluxes and soldering pastes for soft

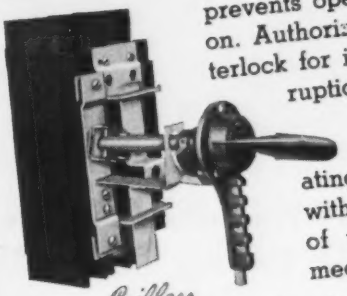
# Circuit Breaker Square D Combination Starter

# NEW DESIGN FEATURES INSIDE AND OUT!



**This combination starter gives you ①increased operator safety ②repeat circuit protection and ③longer motor starter life.**

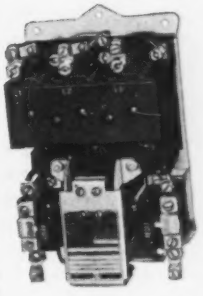
## NEW Circuit Breaker Operating Mechanism



provides maximum operator safety. Interlock prevents opening door when disconnect is on. Authorized person can release door interlock for inspection without power interruption. When door is re-closed, self-aligning handle indicates true position of disconnect. Operating handle can be locked on or off with one, two, three, or four padlocks of varying sizes. Handle-locking mechanism also locks door.

Coilless Thermal Magnetic Circuit Breaker is non-tamperable, gives repeat protection, can be quickly re-set by anyone. Nothing to burn out—nothing to replace.

## NEW Features Added to Magnetic Starter Design



Square D's time-proven design has always provided easy installation, simple maintenance and long life. Now, even longer life is assured by straight line, guided motion of armature and movable contact assembly which eliminates bearing and reduces wear. For added convenience and flexibility, Square D starters now have NEMA standard mounting and wiring.

Square D's packaged parts simplify normal maintenance and minimize replacement part ordering and stocking problems.

*Write* for Bulletin 8539, SQUARE D COMPANY, 4041 N. Richards St., Milwaukee 12, Wis.

**SQUARE D COMPANY**

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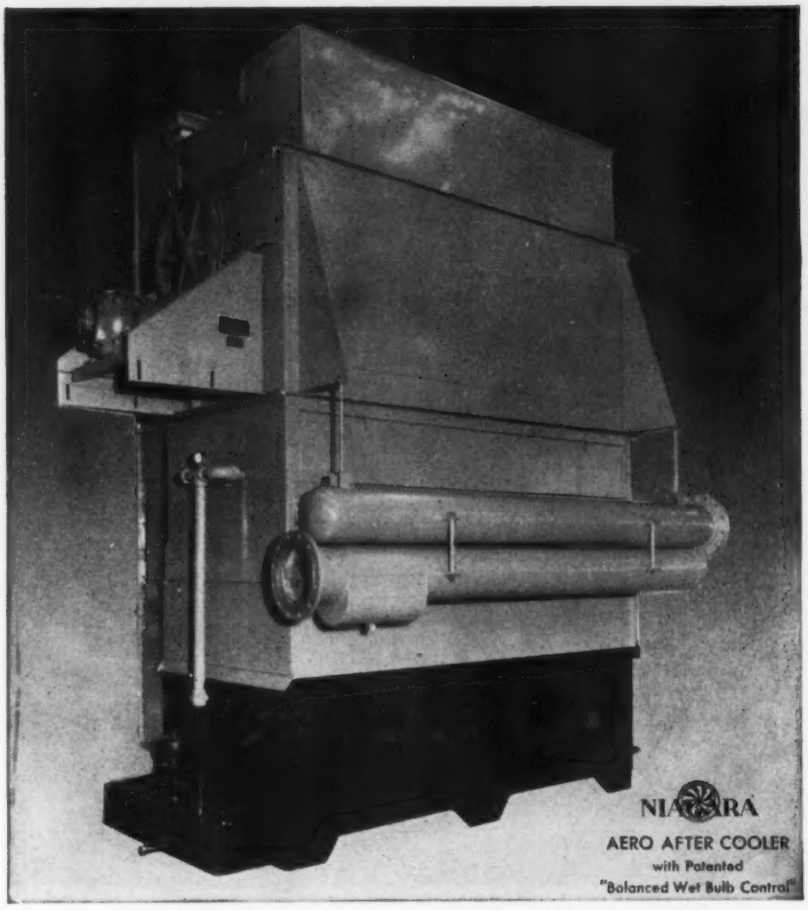
SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.




## How to PREVENT CONDENSATION in COMPRESSED AIR LINES

● Users of pneumatic tools and machinery spend thousands of dollars on repairs and suffer much interruption to production from the condensation of water in their air lines. In compressed gas systems and in processes where compressed air is blown directly on parts and materials in production, there is additional damage.

You can prevent these losses by installing a Niagara Aero After Cooler. It cools the compressed air or gas by evaporative cooling and removes the water before the air enters the receiver. This method brings the air to within a few degrees of the wet bulb temperature, making certain that your compressed air will always be colder than the atmosphere surrounding the lines in your plant, so that no further condensation can take place.

***Savings in cooling water pay for the installation.*** Experience shows that the patented Niagara evaporative cooling method consumes less than 5% of the water required for cooling by conventional means. You save the cost of the water, the cost of pumping it, the cost of disposing of it. These extra savings soon pay for the Niagara Aero After Cooler.

*Write for Bulletin No. 98*

**NIAGARA BLOWER COMPANY**

*Over 35 Years of Service in Industrial Air Engineering*

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*District Engineers in Principal Cities*

INDUSTRIAL COOLING • HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

## FREE PUBLICATIONS

*Continued*

soldering brass, copper, tin, carbon and stainless steels are described. *The Ruby Chemical Co. For more information, check No.* 18 *on the postcard on p.* 35.

### Large DC Motors

Latest construction features of large industrial dc motors, designed for wide speed variation and fine control, are described and illustrated in 40-p. bulletin. *Allis-Chalmers Mfg. Co. For more information, check No.* 19 *on the postcard on p.* 35.

### Cold Finished Steel

High strength, free machinability, good wearability, and minimum warpage are properties of Stressproof cold worked steel as described in 12-p. bulletin. *Lasalle Steel Co. For more information check No.* 20 *on the postcard on p.* 35.

### Bearings

Completely new 112-p. engineering data book on ball and roller bearings lists construction features, prices, weights, load ratings, and dimensions. *Link-Belt Co. For more information, check No.* 21 *on the postcard on p.* 35.

### Die Builders

The solution of actual production problems involving intricate stampings through engineering know-how, modern materials and equipment, is described in 8-p. pamphlet. *Advance Die and Tool Co. For more information, check No.* 22 *on the postcard on p.* 35.

### Acid-Proof Construction

Engineering design, selection and procurement of materials, erection, and maintenance of acid-alkali proof industrial structures are described and illustrated in 8-p. brochure. *Chemsteel Construction Co., Inc. For more information, check No.* 23 *on the postcard on p.* 35.

***Resume Your Reading on Page 35***

# NEW PRODUCTION IDEAS

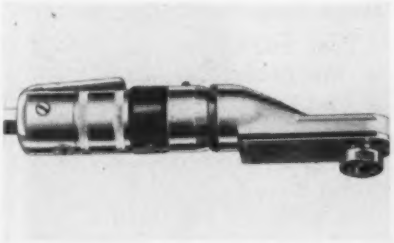
*Continued from Page 38*

combines the desirable characteristics of dc welding with the advantages of ac welding equipment. The unit is a three-phase transformer welder with a quiet three-phase adjustable core-type reactor that gives linear scale current ad-

justment throughout the operating range of the welder. A three-phase, full wave rectifier is a lightweight, compact selenium cell combination, consisting of six stacks of rectangular cells arranged in groups and connected in parallel to give full wave rectification. The welders are rated in accordance with NEMA standards and are available in 200, 300 and 400-amp ratings. *Westinghouse Electric Co. For more information, check No. 36 on the postcard on p. 35.*

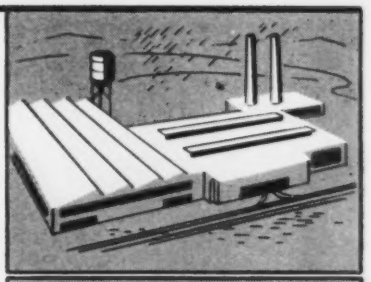
### Electrode Dressers

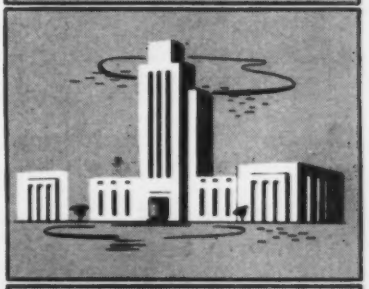
An air-powered electrode dresser is lightweight, portable and equipped with a cutter for re-

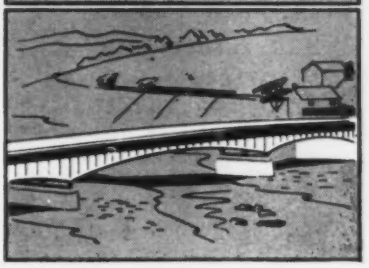


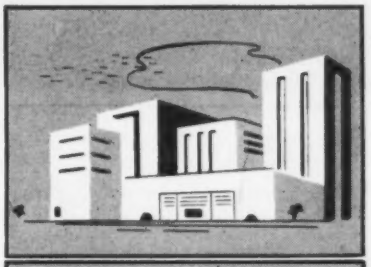
shaping copper electrodes on spot welding machines without removing the tips from the machines.

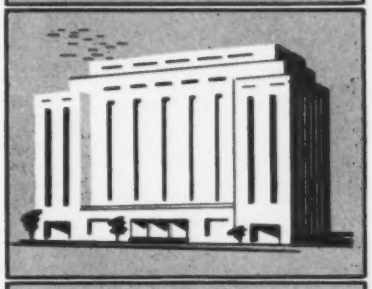
FABRICATION
and
ERECTION
of
STRUCTURAL
STEEL
is our business

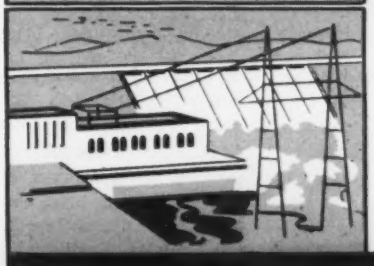












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Whether your construction requires one ton or ten thousand tons—Fort Pitt Bridge is ready to dependably serve you.

The broad knowledge and experience of our engineers, fabricators and erectors extend into every phase of structural steel construction and erection—*the kind of experience that will prove invaluable to your organization.*

***"Steel Permits Streamlining Construction with Safety, Endurance and Economy."***

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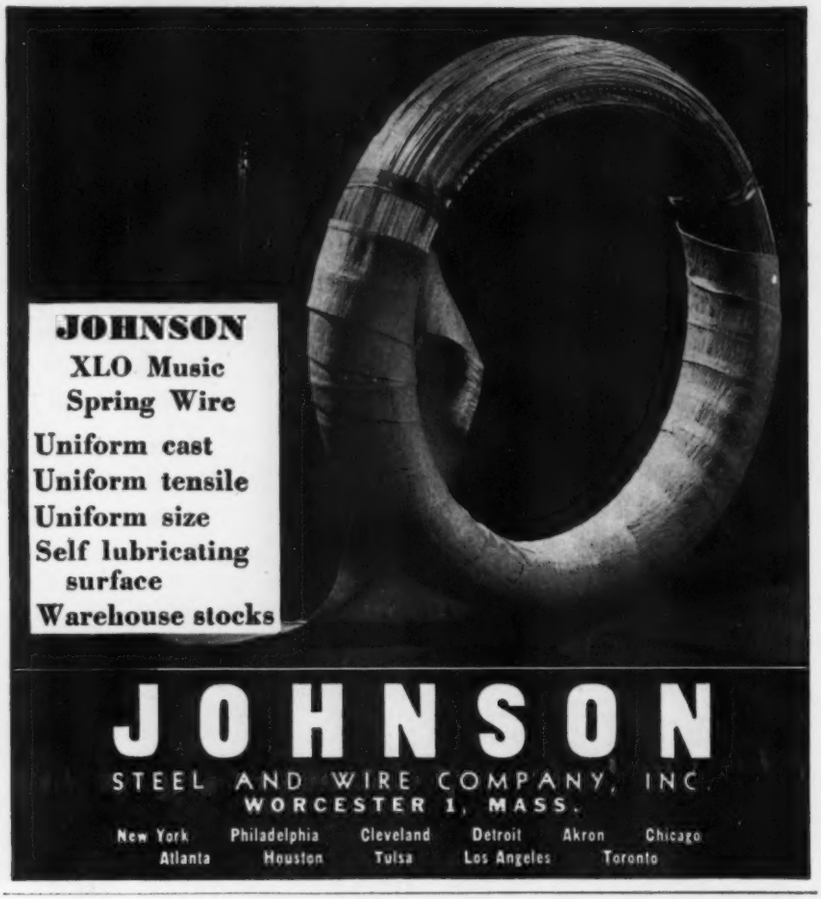
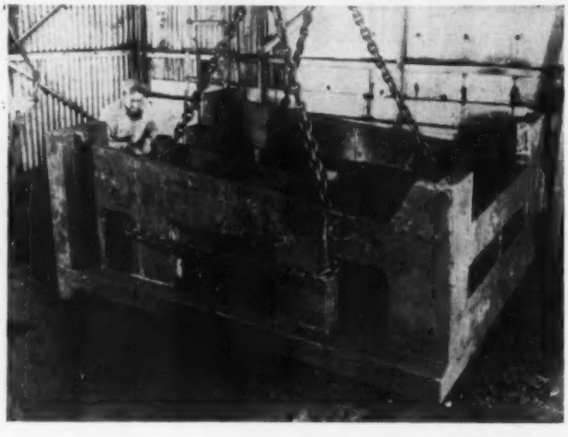


WHAT'S THE FINISHED COST?

In relation to the cost of machining this 18½-ton angle plate, a little difference one way or the other in the price of the casting itself is of small consequence. The chief consideration is the character of the casting—whether it will require the maximum or minimum of finishing.

If a sound, accurate casting costs more, it is worth more because of the savings in the machine shop. On the contrary, a distorted and defective casting entails so much extra finishing cost that it is expensive at a ridiculously low price.

Advance Castings are bought by customers who think in terms of the finished product. Yet they are keenly aware of casting prices and carefully check our quotations. They pay us only what they think Advance Castings are worth—and our business continues to grow.

If you are interested in custom castings that are really economical, we'd like to talk to you.

ADVANCE CASTINGS THE ADVANCE FOUNDRY CO.
DAYTON 3, OHIO

STRENES METAL • ALLOY GRAY IRON • GRAY IRON

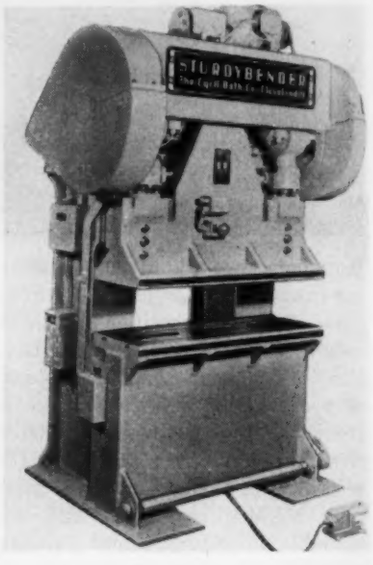
## PRODUCTION IDEAS

*Continued*

The dresser has a speed of 1200 rpm. Combination of the correct angle on the cutter blade and the speed of the tool permits faster cutting, and at the same time, disperses the chips. Cutters for No. 1 and 2 dome, pointed, or tapered type electrodes are available from stock. *Aro Equipment Co. For more information, check No. 37 on the postcard on p. 35.*

### High Speed Brake

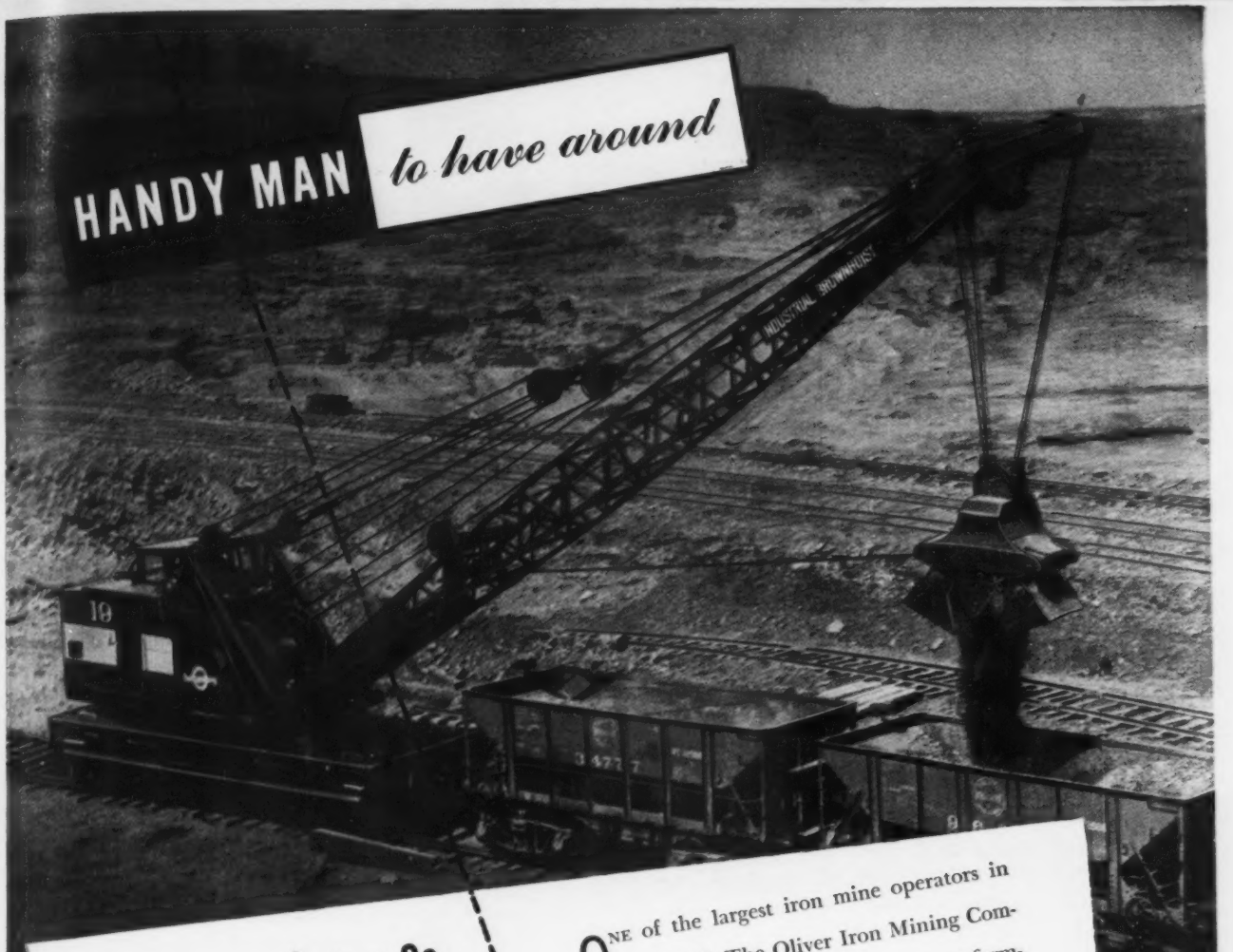
Speeds up to 80 strokes per min are attained in new 35-ton press brake with a die area of 15 x 42 in. Other features include press-




control safety mechanism and overload protection that automatically declutches with excessive loads, preventing damage to press or dies. *Cyril Bath Co. For more information, check No. 38 on the postcard on p. 35.*

### Roll-Duplicating Lathe

Fast machining and fine finish in the production of rolling mill shaped rolls are claimed for a new hydraulic roll - duplicating lathe. Machining time is said to be reduced from 50 to 85 pct over former methods and such a smooth surface finish is produced that subsequent finishing operations are eliminated. A hydraulic duplicating mechanism controls the cut-




## Oliver Iron Mining Co. profitably uses five versatile Brownhoist Diesel Electric Locomotive-Cranes

ONE of the largest iron mine operators in the world, The Oliver Iron Mining Company, gets good steady day-after-day performance in the great Mesabi Range from five 60-ton BROWNHOIST DIESEL ELECTRIC LOCOMOTIVE-CRANES, such as the one pictured here. Track ballasting, relaying mine track, railing cars, and many other tough service jobs are assigned this husky Locomotive-Crane.

You can put this "handy man" to work in your operation for mighty small "keep." BROWNHOIST offers you a complete DIESEL ELECTRIC LOCOMOTIVE-CRANE line . . . 30 ton for general yard work; 50 ton for heavy duty bucket and magnet work with longer booms; and, the heavier 60 ton for work demanding an especially rugged, versatile machine. Write for complete data, today.

*Brownhoist builds better cranes*

**INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN**

DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago. AGENCIES: Detroit, Birmingham, Houston, Los Angeles, Portland, Seattle, Spokane, Canadian Brownhoist Ltd., Montreal, Quebec.

Here's Why
Crane Users
Save Money With

RUD-O-MATIC
TAGLINE
CONTROL

**1.** ON MAGNET PICK-UP JOBS —steel tagline cable takes the load while protective slack is maintained in costly electric cable.

**2.** ON CLAM SHELL BUCKET JOBS—no swing, no sway. Saves time and improves efficiency.

**3.** ON ALL APPLICATIONS—boom and overhead cranes. A heavy duty coil spring assures constant tension without service problems.

Large bearing and fewer sheaves reduce friction and wear.

Easy installation and easy switch to equipment of similar size.

RUD-O-MATIC
COMBINATION
MAGNET REEL-TAGLINE

Available in five sizes for boom crane use and 4 sizes for overhead crane application. Used by steel mills, foundries, shipyards, railway shops and scrap dealers.

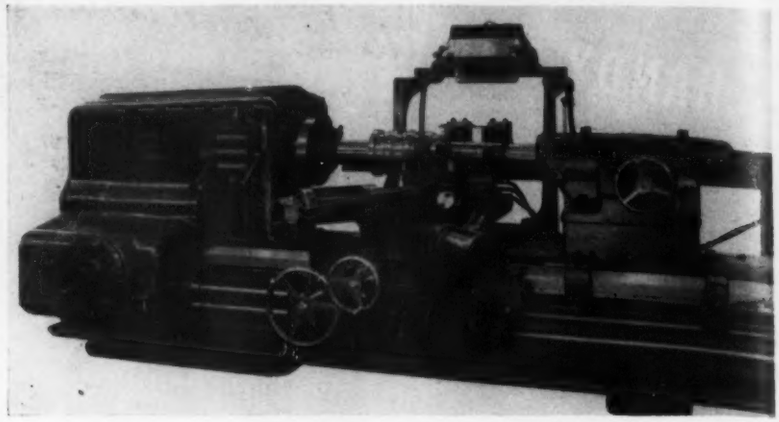
RUD-O-MATIC
TAGLINE

Available in 8 models to provide proper tension and sufficient cable pull out for various size buckets. Used as standard equipment by all leading crane manufacturers.

McCAFFREY-RUDDOCK
Tagline
CORPORATION
2131 East 25th St., Los Angeles 11, Calif.


## PRODUCTION IDEAS

*Continued*



ting tool as it produces from a template the desired roll shape on either chilled iron or steel roll blanks. The mechanical feed, through quick-change gear mechanism, is continuous while the tracer controlled angular slides give stepless generation of the contours. Standard round nose cemented carbide cutting tools are used for both roughing and finishing. The lathe is driven by a 40 hp constant speed motor. The component parts of the lathe are massive and rigid for machining rolls up to 26 in. diam. For generating the roll grooves, a dual slide, all-hydraulic duplicating mechanism is provided. Simplicity of construction and operation makes it possible for an average lathe operator to master its operation in a day's time. *American Tool Works Co. For more information, check No.* 39 *on the postcard on p.* 35.

### Induction Heater

A new induction heating unit is a high frequency vacuum tube type


THOMAS
BENDING AND STRAIGHTENING
Machines

THESE MODERN MACHINES are of all-steel construction and come in various sizes, in capacities from 50 to and including 400 tons. Convenient adjustments for easy, accurate operation.

*Write for Bulletin 315*

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, 23, PA.

9

converter suitable for heating metals and electricity conducting materials. It has a rated output of 25 kw at 100 pct duty cycle with a normal frequency of 450,000 cycles. Units are available for op-

eration on 230, 460 and 550 v, 3 phase, 60 cycle power. Filament voltages of the industrial tubes are automatically controlled by voltage regulating transformers. Conditioned cooling prevents harmful condensation. A system of indicating lamps reveals abnormal conditions at any of the protective devices. Standard equipment includes a synchronous timer with vernier heat cycle adjustment and additional circuits to control two other operations such as quench or fixture movement. The unit is available with one or two working stations. *Lindberg Engineering Co. For more information, check No. 40 on the postcard on p. 35.*

### Alcohol Blow Torch

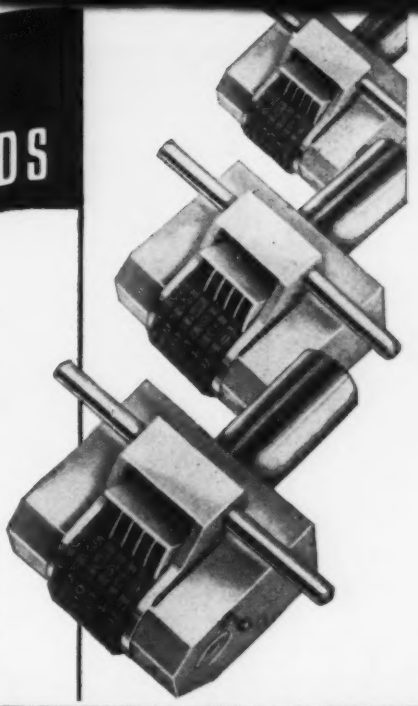
A superheat alcohol blow torch will produce a flame of over 2700°F, this heat enabling the torch to per-

form silver soldering, brazing, sweat fitting work, and soft soldering operations. An unbreakable Bakelite gun-grip handle provides

NOBLEWEST

*Automatic* NUMBERING HEADS

Noblewest automatic numbering heads are guaranteed to be the finest obtainable. Produced from specially selected steel, every part is precision made by master craftsmen in a plant equipped with every modern tool-making facility. Standard models are available in any size numbers from 1/40" to ½". Special numbering heads are made to any requirements including embossing heads, and numbering heads combined with dies. Write to Noble & Westbrook Manufacturing Company, 22 Westbrook Street, East Hartford 8, Conn.



MARK IT BEST WITH NOBLEWEST IMPROVED MARKING DEVICES

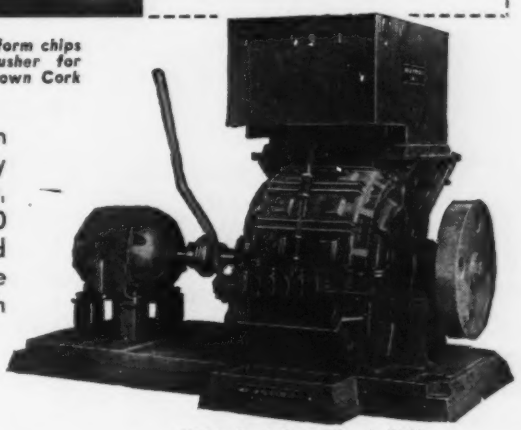
NOBLEWEST

EQUIPMENT FOR MARKING · GRADUATING · EMBOSSING · NUMBERING

**CUTTING-OIL RECOVERY** can buy an **AMERICAN TURNINGS CRUSHER**

*Segregated turnings are reduced to uniform chips by an American Shredder Ring Crusher for highest cutting oil recovery at the Crown Cork and Seal Co., Baltimore.*

The cutting oil reclamation from chips produced from long, curly turnings of steel, alloys, brass, aluminum, etc., increases to 30 to 50 gallons per ton. This yield *plus* the savings in storage space and handling along with higher scrap value of short shovel chips pays for an American Turnings Crusher.



*Write for information bulletin reducing your turnings with an American.*

*American* PULVERIZER COMPANY

*Originators and Manufacturers of Ring Crushers and Pulverizers*

1439 MACKLIND AVE.
ST. LOUIS 10, MO.

**Only Robins gives you all four!**

***You get an exclusive combination of these four outstanding advantages when you use Robins Vibrex Screens***

**1. Floor Mounted.** You save costly installation charges for suspension equipment when you use the Robins floor-mounted Vibrex Screen.

**2. Adjustable to Load and Feed.** The slope of Robins Vibrex Screens is adjustable from horizontal to 30°, to suit changing load requirements of your particular jobs.

**3. Simplified Cloth Changing.** Angle adjustment simplifies cloth changing. Screen cloth slides out easily when the screen is placed in horizontal position.

**4. Self-Dampening Springs.** Robins Self-Dampening Springs completely eliminate start and stop bounce.

In addition, you get all these proved features: Welded construction . . . two-bearing design . . . circle throw . . . adjustable stroke. And the screen is always in perfect balance.

You can get Robins Vibrex Screens in sizes 3′ x 6½′ to 6′ x 16′. Write for complete information on how they can solve *your* screening, sizing, separating or dewatering problems.

**ROBINS**

**VIBREX SCREENS**

**SEND TODAY** for Robins Bulletin No. 122-A. Fully illustrates and describes features, advantages and benefits of efficient Vibrex Screens. Address Robins Conveyors Division, 270 Passaic Avenue, Passaic, New Jersey. No obligation!

ROBINS CONVEYORS DIVISION **HEWITT-ROBINS INCORPORATED**

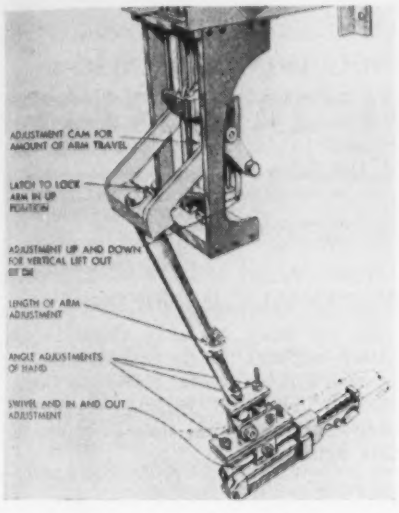
## PRODUCTION IDEAS

*Continued*

a cool comfortable grip. A built-in safety stand enables the torch to be set in various positions on a work bench, leaving both hands free. A sliding windshield allows its use outdoors and indoors with equal efficiency. *Lenk Mfg. Co. For more information, check No.* 41 *on the postcard on p.* 35.

### Iron Hand

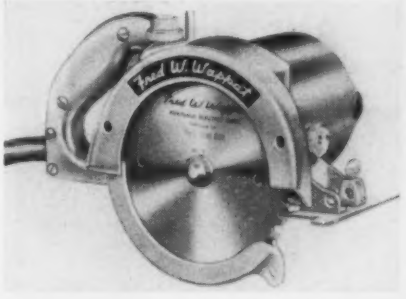
Adaptable to small and medium size punch presses, a junior size Iron Hand automatically removes sheet metal stampings from presses with bed widths ranging up to 72 in. and pressure capacities up to 250 tons. It embodies essentially the same design and operating fea-


ADJUSTMENT CAM FOR AMOUNT OF ARM TRAVEL
LATCH TO LOCK ARM IN UP POSITION
ADJUSTMENT UP AND DOWN FOR VERTICAL LIFT OUT OF DIE
LENGTH OF ARM ADJUSTMENT
ANGLE ADJUSTMENTS OF HAND
SWIVEL AND IN AND OUT ADJUSTMENT

tures of the original and larger size iron hand. The press operator is required only to place the part in the press. The Iron Hand is self-contained, portable and easily transported from one press to another. It can be used to remove blanks or formed articles and is adaptable to open and enclosed type presses. Distances of liftout and swing are adjustable to suit different size stampings. Synchronized with the stroke of the press by electric control, the Iron Hand works automatically and can be locked out of position for die tryout or when the press is idle. Made of steel plate with hardened steel jaws, it can remove parts weighing 20 lb. *Sahlin Engineering Co. For more information, check No.* 42 *on the postcard on p.* 35.

### Electric Hand Saw

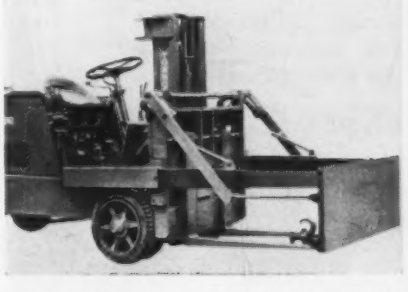
A new plant maintenance tool, a 6-in. electric hand saw, has a $6\frac{3}{8}$ in. blade that cuts to a full 2 in. depth on square cuts, and cuts 2-in. dressed lumber at a 45° angle. Depth adjustment, built-in as an



integral part of the saw, is from 0° to 45°. A trigger-type switch may be locked on. The saw works in any position, is carefully balanced for effortless one-hand operation, weighs 10 lb, and has a telescoping guard and a rigid rip fence. With suitable blades it cuts concrete, tile, brick. *Fred W. Wappat, Inc. For more information, check No.* 43 *on the postcard on p.* 35.

### Die Unloader

Carrying heavy dies to and from the die table of a press is facilitated with a new unloader accessory for industrial fork trucks. The die is picked up on the forks, transported to the press, and deposited on the die table by extending the steel pusher plate of the hydraulic unit. The unit has a capacity of 8900 lb at 25 ft load center and a lift height of 72 in. To remove the die from the table of a press, a length of chain is passed



around the die and linked to hooks at each side of the pusher plate. Retracting the arms pulls the die onto the truck forks. *Towmotor Corp. For more information, check No.* 44 *on the postcard on p.* 35.

*Resume Your Reading on Page 39*


For this Robins Screen or for any screen... always specify

ROBINS Screen Cloth

**1 Needs less changing.** Robins Super-Gyraloy Screen Cloth increases the time between screen cloth changes.

**2 Increases resistance to abrasion.** Super-Gyraloy Screen Cloth is made of specially blended alloy steel wire. Its heat treatment and micro-structure increase resistance to abrasion without sacrificing ductility.

In fact, a wire of this cloth can actually be bent around its own diameter without fracture.

Robins Super-Gyraloy Screen Cloth is tough, hard, stiff . . . yet elastic.

ROBINS SCREEN CLOTH

SEND TODAY for Bulletin No. 113. Fully describes Robins Super-Gyraloy Screen Cloth, 3/16" to 6" openings, made from #12 gauge wire to 5/8" rod in square and rectangular openings, flat top and non-blind weaves. Also in Gyraloy (spring steel), stainless steel, Monel metal or brass in any standard diameter of wire. Robins Conveyors Division, 270 Passaic Ave., Passaic, New Jersey.

HEWITT-ROBINS INCORPORATED

ACME STRAIGHTLINE AUTOMATICS

• CUT POLISHING AND BUFFING COSTS!

Horizontal return—20 to 120 ft. long—adjustable lathes, one or both sides—loaded or unloaded either end or side.

32 ft.-Six Head unit, loading table at one end — unloading at opposite end — loose fixtures return to loading station by gravity roller or power belt as shown.

SPECIAL MACHINERY — AUTOMATIC BUFFING MACHINES

ACME Manufacturing Co.
1645 HOWARD ST. DETROIT 16, MICH.
Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS

"New Process"
Punches • Dies • Rivet Sets
Compression Riveter Dies
Chisel Blanks

Made from high-grade alloy tool steels properly heat-treated, of uniform high quality — may be purchased with complete confidence for maximum service.

Write for Catalog 46

GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL ST., CHICAGO 8, ILL.

# Dear Editor

## BRIGHT DIP

Will you be kind enough to supply the writer with a method for a bright dip on stainless steel without using the electrolytical process?

*EDWARD KOCH*
*Chemist & Plant Engineer*
*Alex. C. Ferguson Co.*
*Philadelphia*

**We were aware that development work was being done along these lines and, upon checking further, found that information has just been released by Battelle Memorial Institute regarding a new chemical method for bright dipping of stainless steel. For detailed information on this subject, contact R. O. Smith, Battelle Memorial Institute, Columbus, Ohio.—Ed.**

## INDUCTION HARDENING

Kindly send a copy of "Induction Hardening on Automatic Screw Machines," which appeared on page 59 of the June 23 issue.

*JOHN Y. BLAZEK*
*Exec. Vice-President*
*Lempco Products, Inc.*
*Bedford, Ohio*

## MATERIALS HANDLING

In the May 26 issue there is an article entitled "Radio Communication System Cuts Material Handling Costs 15 Pct," by E. L. Haase. We would appreciate receiving several copies of this article.

*R. L. ROBERTS*
*International Harvester Co.*
*Chicago*

## TOOL STEELS

Enclosed is my check for one more year of interesting reading, THE IRON AGE. I am also interested in your books on tool and die steels, as well as "10,000 Trade Names." Are these books still available, and if so, where may I purchase them?

*ROBERT H. RIEWALDT*
*Manager*
*Mid-West Spring Mfg. Co.*
*Mentone, Ind.*

**We appreciate your interest concerning "Tool Steel Directory" and "10,000 Trade Names." The cost per copy for Trade Names is $3.00. For one or two copies of the Directory, $2.00 each; three copies for $4.50, and six copies or more at $1.00 each. Let us know your needs and we will forward copies of the above by return mail.—Ed.**

## COMMENTS ON NEW FORMAT

May I congratulate you on the new format? The more I see of it, the more convenient it is. Like most busy people, I would like to read each issue

# OF SPECIAL INTEREST TO STEEL PRODUCERS

## MAJOR SAVINGS OF MONARCH'S NEW METHOD FOR TURNING ROLLS

- Floor-to-floor turning times range from *three to six times faster* on all types of rolls suitable for this new type of contour turning.
- The hundreds of form tools necessary for conventional methods of roll turning are not needed. Only standard carbide turning tools are used—a tremendous saving in tool inventory.
- Since forming of the contour is template-controlled, there is no need to match rolls in pairs. Each roll turned from any given template is identical. One of a pair can be redressed, or a new one turned with definite assurance it will match the other.

## *Announcing The New*
## Monarch Roll Turning Lathe

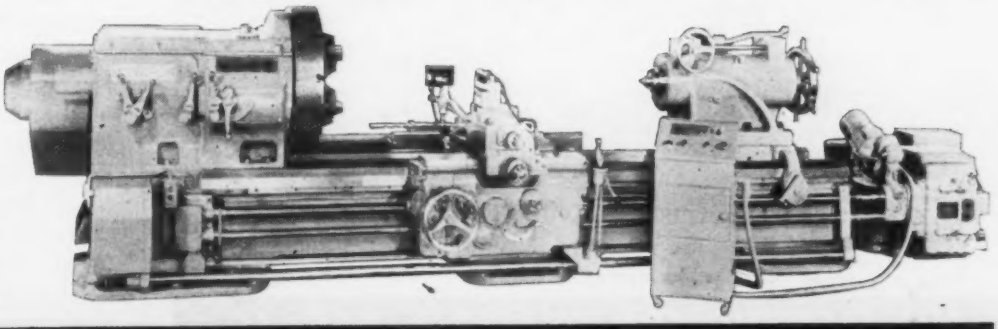
Now! You can contour turn steel mill rolls in one third the time —or less! It's done with the new Monarch template-controlled Roll Turning Lathe, available in two sizes, to turn rolls up to 102″ and 126″ long. Within these ranges the machine will turn an almost infinite variety of shapes on the roll face, and also will handle necks at the same setup.

This revolutionary new time-saving, money-saving machine, based upon Monarch's twenty-year experience in pioneering the design of contour turning lathes, has been proved in use by exhaustive field tests extending over a period of more than a year. Now it is ready to go to work cutting costs in your shop. Better get the full facts without delay. Ask for booklet 1301.

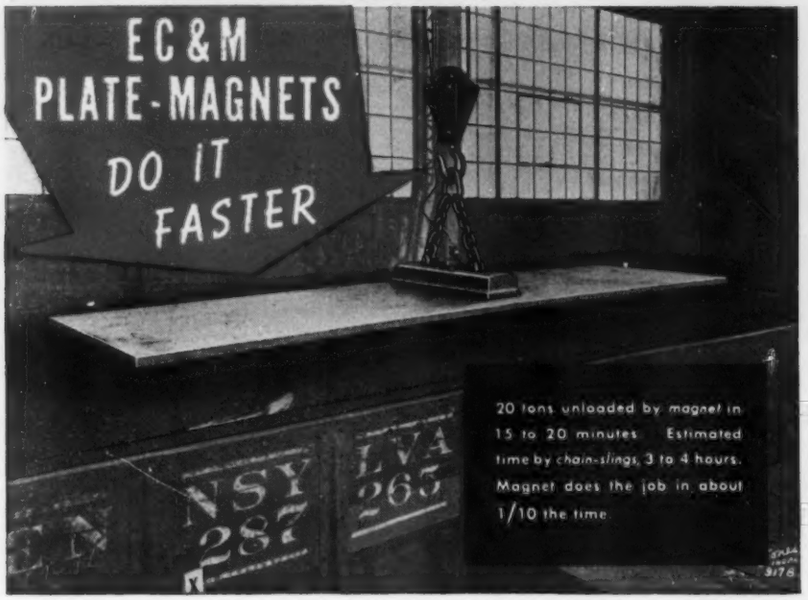
**THE MONARCH MACHINE TOOL COMPANY • Sidney, Ohio**

ACCURACY · ECONOMY · LONG LIFE

*Monarch* TURNING MACHINES



**FOR A GOOD TURN *FASTER* —— TURN TO MONARCH**


EC&M
PLATE-MAGNETS
DO IT
FASTER
20 tons unloaded by magnet in 15 to 20 minutes. Estimated time by chain-slings, 3 to 4 hours. Magnet does the job in about 1/10 the time.

# SAVE UP TO 90%

## IN UNLOADING TIME

Here's a plant that uses several EC&M Plate-Magnets in the loading, unloading, stacking and processing of their plates, sheets, bars, pipe, etc. On long pieces, they use two magnets on a spreader-bar.

These EC&M Magnets not only reduce operating costs but they speed up handling. Railroad cars or trucks are loaded or unloaded without delay and handling throughout the plant is fast. There's no prying to affix chains and no danger of pinching hands when securing chains.

Send us the complete facts of your handling needs, so that we may write fully when sending Bulletin 903 describing EC&M Plate-Magnets.

Burned Plates, too, pull out easily when lifted by Magnet.

**TELL ALL FOR PROMPT RECOMMENDATION**

Give an idea of your plant layout and equipment, and material handled, such as

1 - Style and capacity of crane.
2 - Voltage available (direct current is required for magnets).
3 - Overall dimensions and weight of material handled.

**THE ELECTRIC CONTROLLER & MFG. CO.**

2098 EAST 79TH STREET • CLEVELAND 4, OHIO

## DEAR EDITOR

*Continued*

through carefully as soon as it arrives, but usually have to choose a few items of special interest for immediate reading. The new index makes it easy for me to do this. Furthermore, the articles are actually easier to read! I feel that the new format added a great deal to my own recent contributions to your magazine.

*REBECCA H. SMITH*
*Chief Metallurgist*
*Turbodyne Corp.*
*Hawthorne, Calif.*

### IRON AND STEEL MILLS DIRECTORY

Sir:

We kindly request you inform us whether you publish an iron and steel manufacturer's list for all mills in the United States, stating also their specialty of manufacture. In the affirmative case, we would appreciate very much receiving such a list, or directory.

*W. BOLKEN*
*R. Kupsch, New York, Inc.*
*New York, N. Y.*

● The Directory of Iron and Steel Works published by the American Iron & Steel Institute, 350 Fifth Ave., New York 1, should be helpful. It carries not only the name and location of each mill, but a full description of its equipment and size and type of products.—Ed.

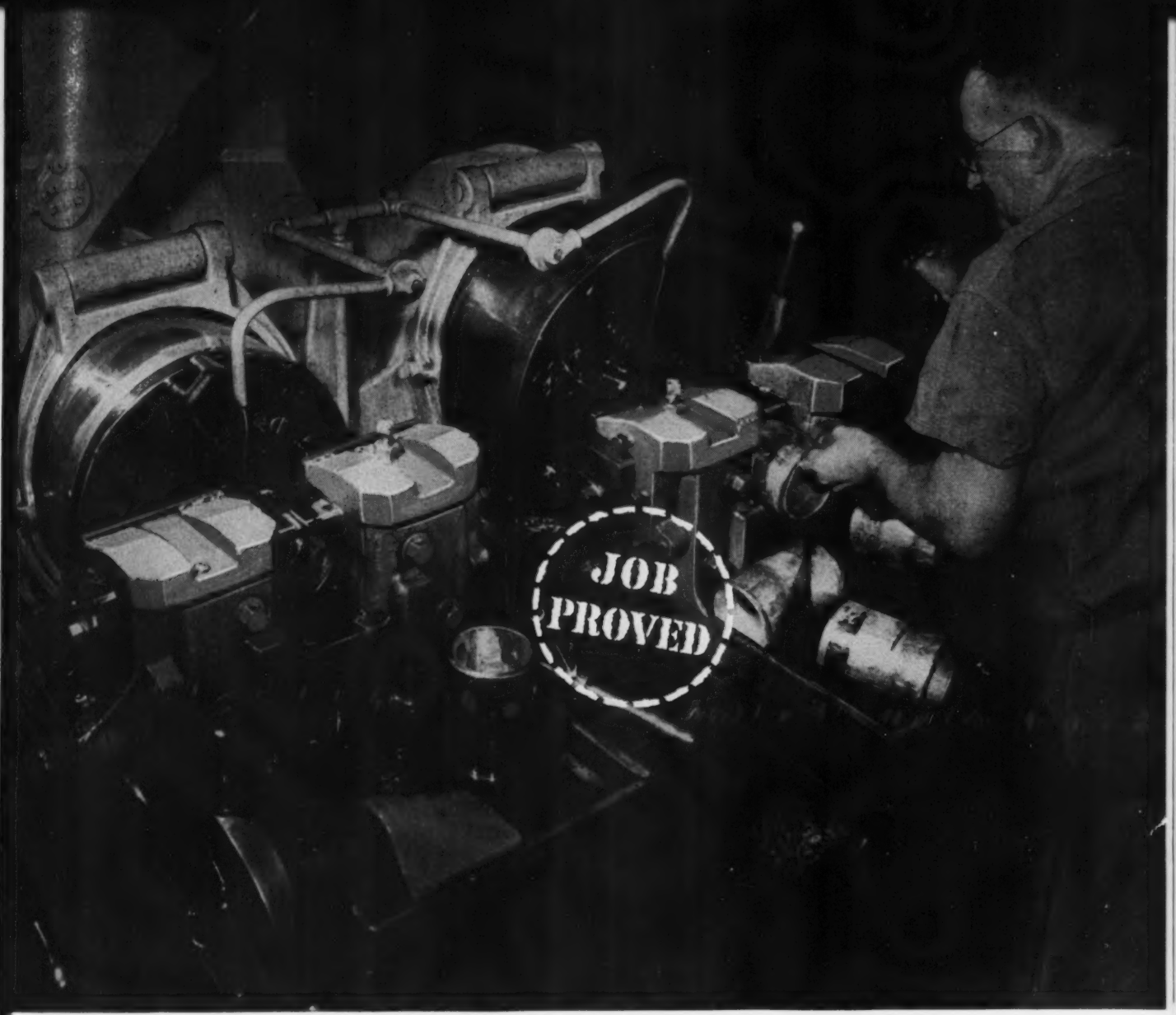
## Continuous Galvanizing

*Continued from Page 79*

of the zinc itself is shown in fig. 14.

The successful functioning of a continuous process that involves a series of operations requires the utmost in attention to details of engineering design. A malfunctioning at any point in the processing means the cessation of activities along the entire line. An important problem in engineering is to provide means for guarding against spoilage of material in process if a delay should occur. These problems have been well met in designing the Irvin line, and the operating personnel have been so trained that the amount of substandard material produced and the actual amount of time lost in delays have been insignificant.

*Resume Your Reading on Page 80*




# CHASER LIFE INCREASED 50%

## Sun Cutting Oil Improves Quality of Threads, Steps-up Pipe Nipple Production

**Operation:** Threading 4" pipe nipples

**Machine:** Landis Threading Machine

**Material:** 4" galvanized welded steel tubing SAE 1025-1040

**Speed:** Threading 1½" on each end of about 300 pieces per 8-hr. day

**Chaser Life:** 3 days before resharpening

**Cutting Fluid:** Sun Cutting Oil 31W

A manufacturer threading pipe nipples was not getting satisfactory finished threads with the cutting fluid in use. Chaser life was abnormally short, resulting in excessive downtime and high percentage of rejects, with consequent loss of production.

Changing to Sun Cutting Oil 31W, this shop increased chaser life 50 percent, and reports that "the threads are the best we ever made." With rejects practically eliminated and downtime for changing chasers reduced to the absolute minimum, production has greatly increased.

Sun Cutting Oil 31W is a dark, free-flowing, sulphurized oil. It is recommended for heavy duty jobs where an emulsified cutting oil is not suitable. For further information about Sun Cutting Oils or other "Job Proved" Products for the metalworking industry, call or write the nearest Sun Office. The services of a Sun Engineer are available without obligation.

**SUN OIL COMPANY** • ***Philadelphia 3, Pa.***

*In Canada:* Sun Oil Company, Ltd.
Toronto and Montreal

**SUN PETROLEUM PRODUCTS**

**"JOB PROVED" IN EVERY INDUSTRY**

SUNOCO

## "The New Twist"

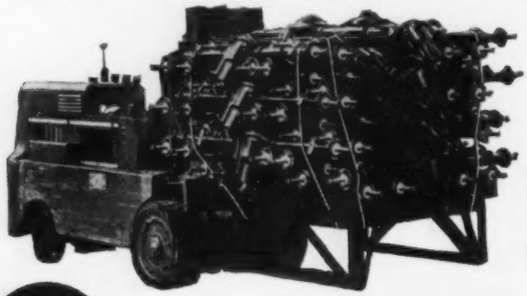
## for your strapping operations . . . GERRARD

● Gerrard Round Steel Strapping is adaptable to almost every type of tying operation. Between the 18 gauge strapping for protecting parcel post packages and the 8 gauge strap for securing carload lots of steel pipe or machinery, there's a size of Gerrard Strapping that will do your job perfectly.

Because it's *round*, Gerrard Steel Strapping grips where it touches. It is ideal for pallets and has been used successfully to palletize such odd shaped objects as auto springs and rear axles. *And Gerrard Round Steel Strapping costs about 40% less than any type of metal reinforcement.*

Gerrard engineers will gladly consult with you about your strapping problems free of charge. Send for the *Blue Book of Packaging*. It is free. GERRARD STEEL STRAPPING COMPANY, 4745 So. Richmond Street, Chicago, Illinois.

Gerrard Steel Strapping Company
4745 So. Richmond St.
Chicago 32, Ill.
Please send me, without obligation, free copy of Blue Book of Packaging.
Name.....
Company.....
Address.....



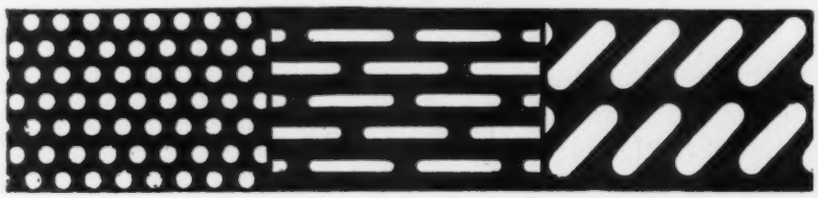
Gerrard Round Strapping grips where it touches, conforms to the odd shape of the auto axles on the pallet.

USS

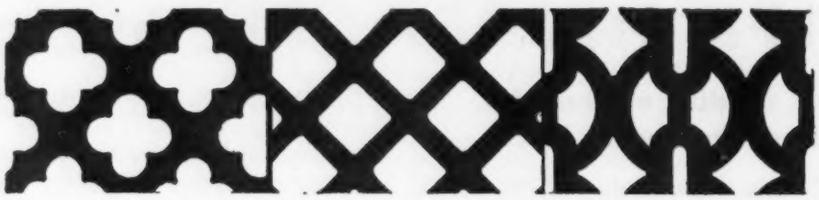
**GERRARD**
**ROUND STEEL STRAPPING**

UNITED STATES STEEL





***For whatever purpose you need perforated metal***



**Hendrick will fabricate it to your specifications * * * from any commercially rolled metal * * * in any gauge * * * with any shape or size of openings. Extensive plant facilities, an unsurpassed stock of dies and tools, and more than 70 years' experience in perforating metals, are at your service.**

**Write us regarding your specific requirements.**

SEE OUR CATALOG IN SWEET'S

# HENDRICK

*Manufacturing Company*

**37 DUNDAFF STREET, CARBONDALE, PENNA.**

*Sales Offices In Principal Cities*

**Perforated Metals**
**Perforated Metal Screens**
**Architectural Grilles**
**Mitco Open Steel Flooring,**
**"Shur-Site" Treads and Armorgrids**


## FATIGUE CRACKS

*Continued from Page 20*

Thus his total yearly expenditure runs $115.

### Menace

We've been waiting quite a spell now to have Congress take positive action on the entry and activities on potential enemy agents in the United States.

Your favorite family journal's Washington bureau tipped us off the other day that the great moment had come. Thereupon, they forwarded a copy of the House of Representatives Bill 6242, entitled "A Bill To Prevent the Entry of Certain Giant Snails into the United States."

Washington says not to expect quick action.

### BURR

Take a letter, Mrs. Flood, to J. Malvern Benjamin, Philadelphia representative for Chicago's Durable Punch & Die Co.:

"Yes, we were serious in printing Joseph Anderle's request for a definition of a burr (September 15). Just as serious, anyway, as he was in asking.

"We are passing along your definition—'any extension of metal beyond the general plane of the workpiece in the particular neighborhood under consideration (taking plane to mean *surface* intended by the design, whether it be a *plane* or curved surface)'.

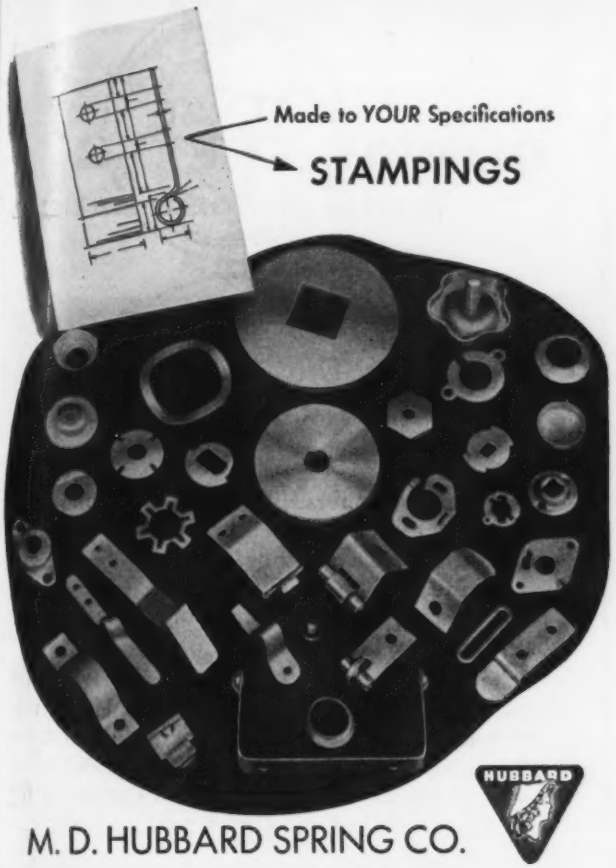
"You say that getting a burr does not depend on dullness of the punch or die; that there may be other causes, such as clearance. In posing his question, Reader Anderle assumed proper clearance, and generally acknowledged that there still might be sharp edges, but didn't think they should be called 'burrs'.

"As we get it, you say they're still burrs, even if they extend as little as 0.001 to 0.003 in., that it's almost impossible not to get them even though the punches are as sharp as Durable's are until they break, and that naturally such minute edges aren't objectionable.

"The area of potential difference between your definition and Reader Anderle's assumption seems to go beyond those few thousandths, since he doesn't seem to think the term 'burr' should be used until the imperfection becomes objectionable. And what, he asks, makes it objectionable except a dull punch or die?

"There's honest difference of opinion here, all right. Since the few thousandths of an inch in which the debate centers doesn't give us space to wave our arms, we're retiring to a neutral corner and let the experts talk it out. Sincerely, Your F.F.J."

***Resume Your Reading on P. 21***




M. D. HUBBARD SPRING CO.

325 CENTRAL AVE • PONTIAC 12, MICH.

Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

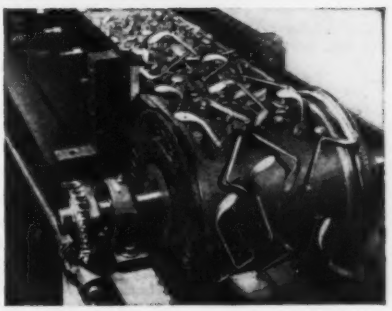
ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

Eriez NON-ELECTRIC MAGNETIC PULLEY

Increases Production 1200%

from 2½ hrs. to 10 minutes



Close-up of Eriez pulley at L. C. Smith and Corona Typewriter, Inc. Available in 78 sizes.

L. C. Smith and Corona Typewriters Inc., now separates tumbling stones from metal working parts in ten minutes — a job which formerly took two and half hours. And this amazing cost saving was affected by the use of an Eriez Non-Electric Permanent Magnetic Pulley. Previous to this Eriez installation, separation was done manually —2½ hours was needed for each barrel. Since the Eriez Pulley is completely non-electric and requires no electricity, it can be mounted on a portable conveyor and used on any number of lines. Separation is automatic and complete. Eriez makes a full line of permanent non-electric magnets. Their versatility of application is almost unlimited; perhaps it's the separation of ferrous from non-ferrous materials, the protection of machines, the conveying of pipe, angles, sheet steel, etc., or for use in the foundry, galvanizing baths or machine operations. Whatever the job, there's an Eriez magnet for it.

Perhaps you have a metal separation or material handling problem that Eriez can solve quickly and economically. Magnetic application engineering is yours for the asking. Representatives in all principal cities. *Write, wire or phone Eriez Manufacturing Co.*

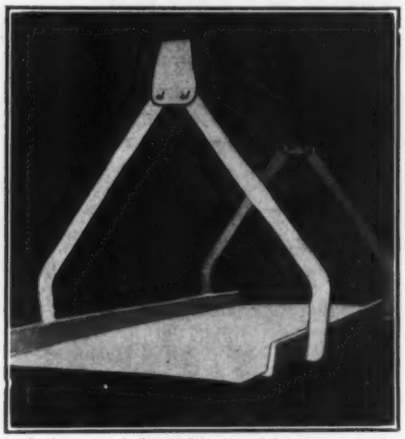
SEE OUR CATALOG IN SWEET'S — See our catalog P 1b/2 Sweet's Process Industries File.

Pioneer of Permanent Magnetic Separation

ERIEZ MANUFACTURING CO.

699 East 12th St. • ERIE, PA.

**Low Price Pinch Hitter**
**FOR HANDLING SHEET STEEL**



Ideal where use is intermittent and head room unimportant. Easily operated by one man where speed is not vital—and by two where it is. A definite improvement over chains, yet costs about two-fifths as much as our next best "low headroom" type. Write for full particulars of No. 1137.

***Other Styles for Other Uses***

COMPLETE YOUR CRANES WITH
**MANSAVER GRABS**

MANSAVER INDUSTRIES, INC., 3106 EAST ST., NEW HAVEN, CONN.

**DRAVO *Counterflo* HEATERS**

Figure all the costs—fuel, attention, lost production time while workers thaw out their hands—you'll find the salamander is one of the most expensive forms of heating you can use . . . and that the Dravo *Counterflo* method is definitely more economical. Dravo Heaters warm large open areas without duct work. Can provide tempered make-up air and year round ventilation. Oil or gas fired—readily switched from one to the other. Stainless steel combustion chamber. Up to 22,000 CFM air handling capacity per unit. Easily installed, 80-85% efficiency, AGA approved and UL listed. Ask for Bulletin FG-523-68

**DRAVO** CORPORATION
DRAVO BUILDING, PITTSBURGH 22, PA.
*Sales Representatives in Principal Cities*
Mfd. and Sold in Canada by Marine Industries, Ltd., Sorel, Quebec

# GLOBAL LETTER
## REVIEW OF WORLD MARKETS

*Continued from Page 28*

High Commissioners gives the Germans the choice of either maintaining the same mark price on export coal as before the devaluation, or of adjusting the export and/or the internal price in such a way that the difference would be no greater than before.

The French, by far the biggest importers of coal and coke from Germany, insisted that the German iron and steel industry should not be subsidized by lowering domestic coal and coke prices at the expense of importing countries by making too high a margin of profit on the export price of fuels.

**French Object to Price**

German coke, at the present time, costs domestic consumers 42 marks ($12.60, old rate of 30¢, or $9.99 at the new rate of 23.8¢) a metric ton, f.o.b. coking plant, while foreign customers must pay 50.5 marks ($15.15 old rate or $12.01 at the new rate) f.o.b. coking plant, and 63.3 marks ($18.99 old rate, $15.06 new rate) at the border, including rail freight to the French Saar frontier railway station. It is the difference between the home price of 42 marks and the export price of 50.5 marks f.o.b. coking plant which is considered too high.

A continuation of this disguised form of subsidising, according to the French point of view, would give German industries a great advantage over foreign competitors. Dumping of artificially low priced German products would be the inevitable result, and at the same time would hamper foreign competition on the German home market. For this reason pressure is being put on prices of fuel exports.

## Tin Marketing Changes on the Way

**London**—Bulk-buying of Empire tin by the Ministry of Supply is to end as soon as alternative marketing arrangements can be made through the London Metal Exchange. The Singapore market is also expected to reopen. Meanwhile, the ministry has made tin again available to domestic and foreign buyers, after

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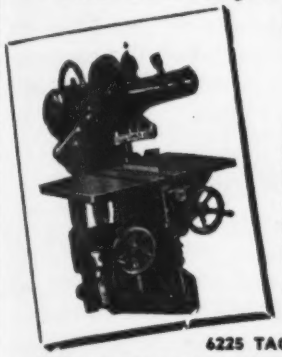

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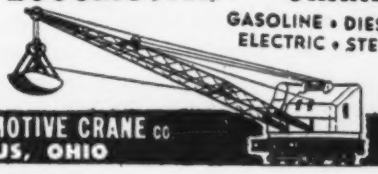

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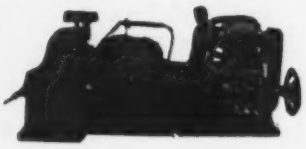

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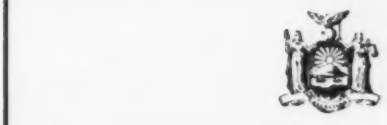

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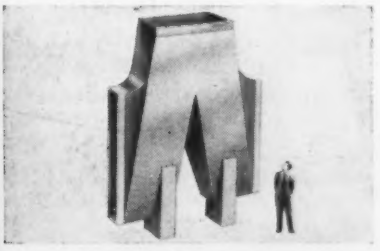

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*Continued*

suspension of dealings while official policy was realigned to the devaluation of sterling.

United Kingdom buyers pay an all-time peak price for tin of £750 ($2,100) per ton, as against £569 ($1,593.20) formerly. The price to United States consumers is reduced from the former $1.03 per lb to 95¢, equal in sterling to £739 ($2,019.20) a ton ex smelter at Penang or Singapore.

Discussions are in progress between the government and the committee of the London Metal Exchange with a view to reopening the exchange for dealings in tin "at the earliest practicable date, and determination of the conditions in which it will operate." The exchange, which has been closed since early in the war, may reopen in about a month.

## French Production Still Gaining

**Paris**—Average monthly output of crude steel in France increased from 607,000 metric tons during the second half of 1949 to 767,000 tons during the first half of 1949. This is an increase of 26 pct. During the same period average monthly production of rolled finished products increased from 427,000 tons to 528,000 tons. This is an increase of 23 pct.

Improvement in domestic supplies has caused controls to be lifted on all products except thin sheets which are still in tight supply. Export quotas are practically eliminated. Average monthly exports during the first half of the year were 55 pct greater than during the second half of 1948. The tonnage and destination are shown in the accompanying table.

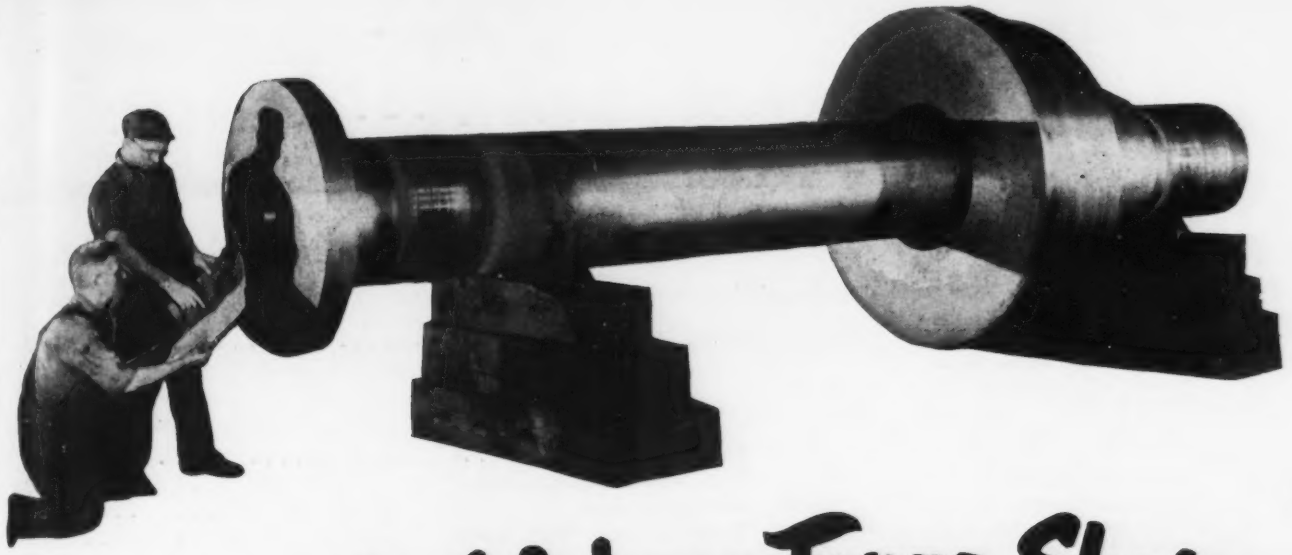
French Iron and Steel Exports
(in metric tons)

| | Monthly average 1st half 1949 | July | August |
|---|---|---|---|
| To foreign countries | 76,160 | 61,000 | 110,000 |
| To French territories | 35,500 | 25,000 | 32,000 |
| Total exports ..... | 111,660 | 86,000 | 142,000 |

## British Auto Makers Pledge Exports

**London**—Leaders of the automobile industry have given their pledge to do everything in their power to push the sale of cars in the dollar countries. The official 25 pct home quota for private cars equals 75,000 a year. For some time makers have been selling more.

New arrangements to take advantage of devaluation are likely to cut down the home quota to 60,000 a year, compared with 300,000 before the war. Makers have been told that the government will be more rigorous in allocating sheet steel between exporters who succeed in selling cars to the dollar countries and those who do not. *Resume Your Reading on Page 29*



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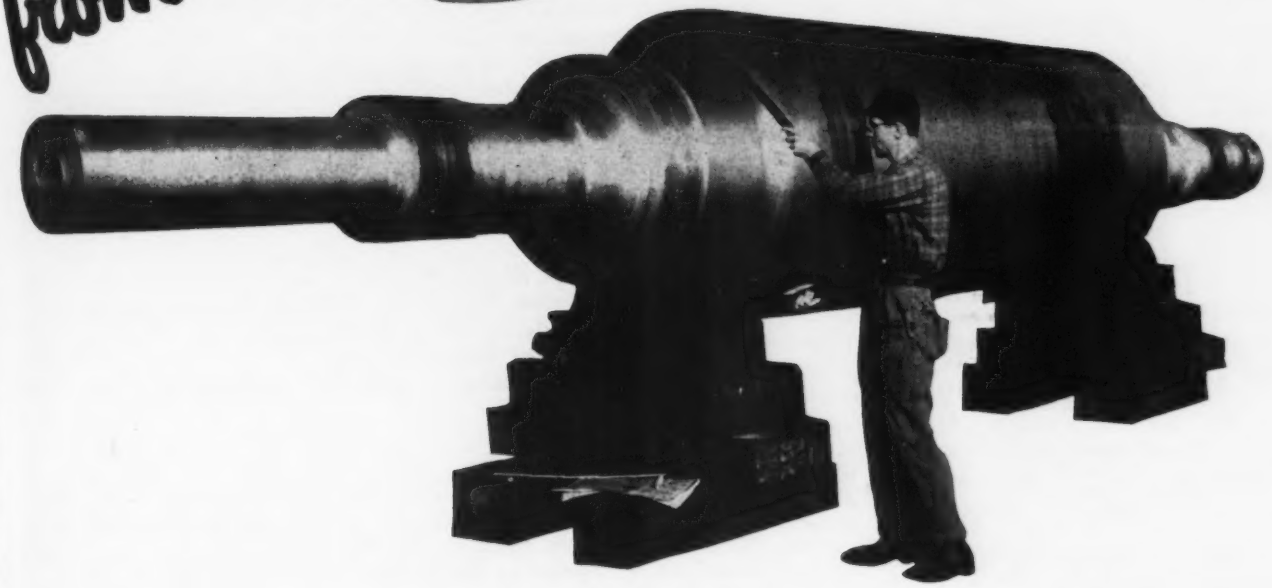

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